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NATIONAL WATER RESEARCH INSTITUTE

DIRECTORY OF STUDY PLANS 1983-84

INLAND WATERS DIRECTORATE

NATIONAL WATER RESEARCH INSTITUTE
DIRECTORY OF STUDY PLANS

1983-1984

NATIONAL WATER RESEARCH INSTITUTE
CANADA CENTRE FOR INLAND WATERS
P.O. 5050
BURLINGTON, ONTARIO
L7R 4A6

JUNE 1983

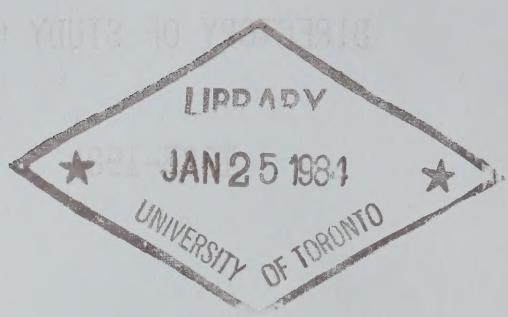


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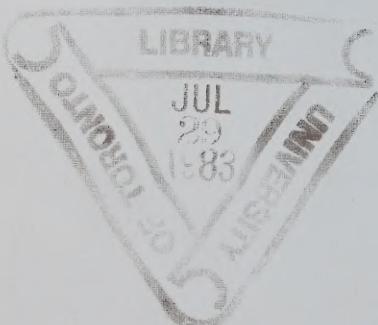
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INTRODUCTION

DIRECTORY OF STUDY PLANS 1983-84

The National Water Research Institute

This Directory provides the sixth annual indexed catalogue of planned research, development, engineering, scientific service and support service projects of the National Water Research Institute of the Inland Waters Directorate, Environmental Conservation Service, Department of the Environment, for the Fiscal Year 1983-84.

This report is an internal document developed for operational purposes.

Programs internally are represented by the Divisional structure, designed to meet management requirements and Directorate program thrusts.

The relation amongst the management units is illustrated in the chart on the following page.

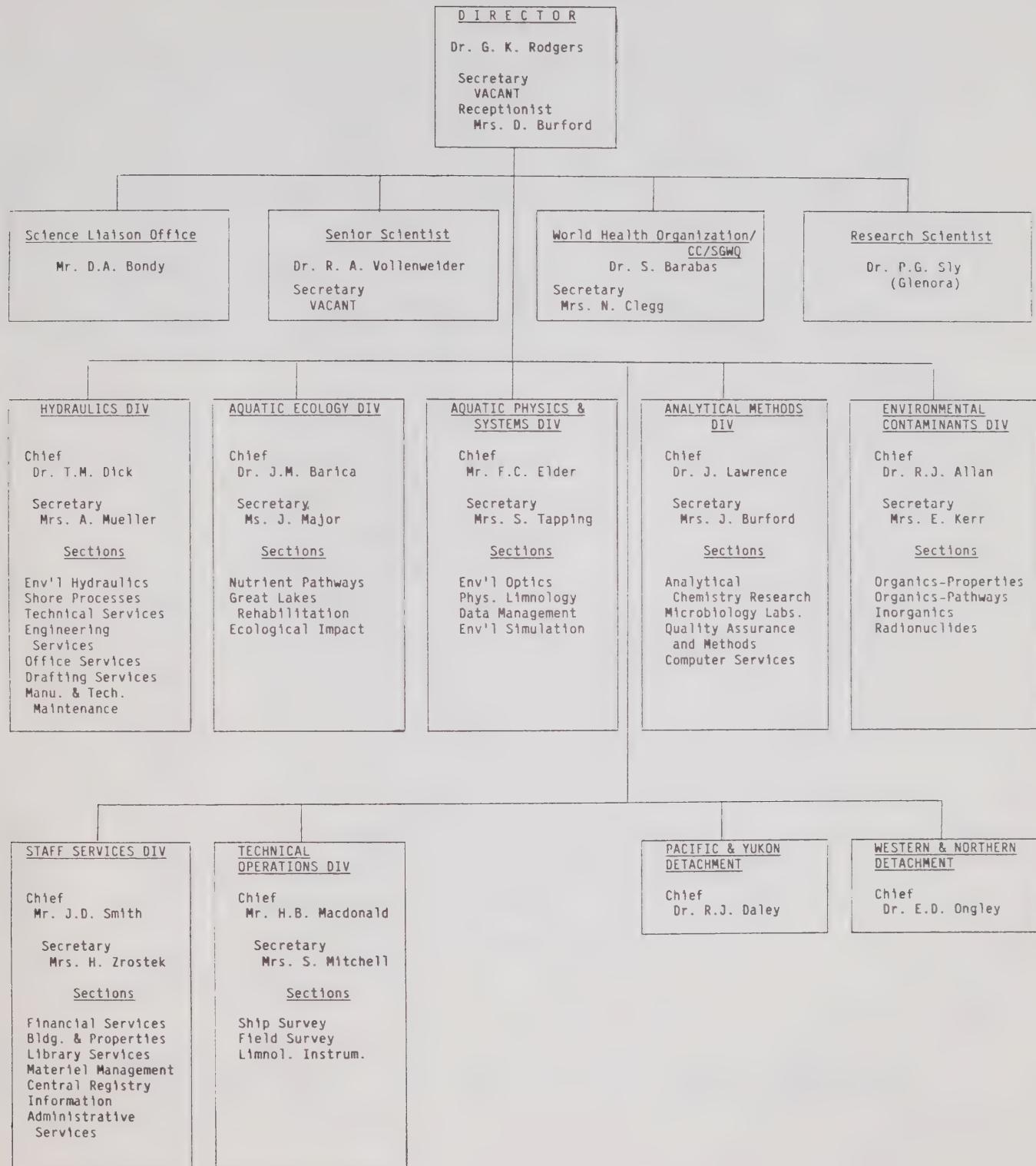
If it is required, more detailed management and scientific information is available from the managers and project leaders.



G.K. Rodgers
Director

June 3, 1983

NATIONAL WATER RESEARCH INSTITUTE



Key to Study Resources Summary - Form B

This form, found at the beginning of each Division's Study Plans, summarizes the resources that have been allocated to each Division by study. This file will be kept updated throughout the fiscal year to reflect any major new allocations or shifts in allocations so that program resources can be assessed with respect to policy or to resource commitments to senior management. The forms do not report actual expenditures. Cost codes and regular accounting procedures will be used to track actual expenditures.

The number in the first column identifies the Study Plan to which the resources have been allocated. The first portion of the form (columns 2 to 16) identifies A-Base resources from the Organization (Division) and support services of Engineering, Technical Operations and Data Management. Columns 17 to 20 identify External funding sources such as:

GLWQA -	Great Lakes Water Quality Agreement
AQWED -	Aquatic Weeds - IWD-HQ
PPWB -	Prairie Provinces Water Board
FCOP -	Francophone Co-op Program
SYEP -	Student Youth Employment
DMNAT -	Deputy Minister Native Hiring Program
COSEP -	Career Oriented Summer Employment Program
WHO -	World Health Organization
EPS -	Environmental Protection Service
DML RTP -	Deputy Minister Long Range Transport of Airborne Pollutants
TCMP -	Toxic Chemicals Management Program
IWDONT -	Inland Waters Directorate Ontario Region
OSS -	Ocean Science and Surveys
GLFRB -	Great Lakes Fisheries Research Branch
PARKS -	Parks Canada

Column 21 identifies Shadow costs for which there is no transfer of resources to the lead section. The last five columns (22-26) show Total Resources for any given study plan.

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Each project is identified by a three digit study number. The first digit identifies the responsibility centre and the next two digits identify the study.

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DATE RUN 33/06/23.

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA M			EXTERNAL			SHADOW			TOTAL RÉSOURCES		
	PY SAL	OM	CAP	PY SAL	OM	CAP	PY SAL	CM	CAP OUTM	PY SAL	AGCY	PY SAL	CM	CAP COST	PY SAL	OM	CAP	PY SAL	OM	COST	
101	2.00	78	50.0	26.5	--	--	--	--	--	--	--	--	--	--	2.00	78	50.0	26.5	154.5		
102	2.00	85	20.0	--	--	--	--	--	--	--	--	--	--	--	2.00	85	20.0	--	105.0		
103	2.00	70	37.0	--	--	--	--	--	--	--	--	--	--	--	2.00	70	111.0	--	161.0		
106	--	--	23.7	94.5	--	--	--	.05	2	2.0	--	--	--	--	.05	2	25.7	94.5	121.7		
109	.50	25	4.0	--	--	--	--	--	--	--	--	--	--	--	.50	25	4.0	--	29.0		
110	.50	25	5.5	--	--	--	--	--	--	--	--	--	--	--	.50	25	5.5	--	30.5		
115	1.00	47	5.0	--	--	--	--	--	--	.10	3	--	--	--	1.10	50	5.0	--	55.3		
	8.00	330	145.2	121.0	--	--	--	.05	2	2.0	--	.10	3	--	8.15	335	221.2	121.0	677.0		

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-101

STUDY TITLE	NWRI Branch Management	DIV OR ORG NWRI
KEY WORDS	MANAGEMENT	SEC'N OR GRP BRANCH
STUDY LEADER	Rodgers, G.K.	TEL: 637-4625 PAE 1910
TEAM MEMBERS	Director's Secretary (vacant), D. Burford and NWRI Administration and Programs Management Teams	DATE 82/12/02
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Offices of the DG, Directors and their immediate staff	

Goals

1. Improve effectiveness through IMPAC.
 - a) Develop more quantitative project planning beyond one fiscal year.
 - b) Prepare NWRI input to ECS planning process.
2. To achieve NWRI targets for affirmative action plans.
3. To enhance NWRI's "national" image, provide leadership in water research and anticipate (and research for) future problems.
4. To improve Human Resources Management in NWRI.

1. a) Long Term Operational Plans.
b) As required.
2. Targets as defined in HQ memorandum.
3. Visits to Regions. Meeting of NWRI Management Team - Programs (3-4 times/year).
4. Formulate complete Training and development program. Review Employee Assistance Program.

Performance IndicatorsJustification

To promote efficiency, effectiveness and economy in the management of NWRI's water research and support services.

STUDY TITLE	Eutrophication	DIV OR ORG
KEY WORDS	EUTROPHICATION, OECD	SEC'N OR GRP
STUDY LEADER	Vollenweider, R.A.	PAE 1714
TEAM MEMBERS	L. Janus and S.M. Horne	DATE 82/01/13
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

GoalsPerformance Indicators

1. Synthesis of the total OECD data base, including particularly the Canadian contribution, with development of predictive statistical models.
2. Manual on eutrophication control in warm water reservoirs.
3. Advisory work nationally and internationally on limnological research.
1. Publication in Archives of Hydrobiology in 1983.
2. Completion of text and manual.
3. As appropriate.

Justification

Provides Canadian participation and leadership in international activities.

STUDY TITLE	WHO Collaborating Centre on Surface and Ground Water Quality	DIV OR ORG NWRI
KEY WORDS	WATER QUALITY, DATA COLLECTION, DATA QUALITY, GEMS/WATER, GROUNDWATER, INTERNATIONAL RELATIONS, TECHNOLOGY TRANSFER	SEC'N OR GRP WHO/CC
STUDY LEADER	BARABAS, S.	TEL: 637-4309 PAE 1940
TEAM MEMBERS	N.J. Clegg J. Rogalsky	DATE 82/12/02
ECS PROGRAM	Management and Administration	
ACTIV ELEM	International Relations	

Goals

1. Publication of quarterly journal WATER QUALITY BULLETIN
2. Publication du journal trimestre BULLETIN DE LA QUALITE DES EAUX
3. GEMS/WATER Inter-regional Project Review to assess and evaluate 1979-81 data base
4. Preparation of GEMS/WATER Project Directory (a listing of all participants from every facet of the GEMS/WATER program)
5. Organization of GEMS/WATER Analytical Quality Control Training Course for Latin America
6. Arrange visits for foreign visitors to NWRI and consultancies abroad
7. Reviews of manuscripts for (i) monograph on eutrophication, and (ii) wastewater management in industrialized countries.

Performance Indicators

Volume 8, Numbers 2 (April 83); 3 (July 83); 4 (October 83); and Volume 9, Number 1 (January 84)

Volume 8, Nos. 2 (juin 83); 3 (septembre 83); 4 (décembre 83); et Volume 9, No. 1 (mars 84)

June/July 1983

December 1983

April/May 1983

as required

late 1983/early 1984

Justification

Canada's commitment to the World Health Organization to assume the responsibilities inherent in the designation of the National Water Research Institute as the WHO Collaborating Centre on Surface and Ground Water Quality. Such responsibilities comprise coordination of international programs aimed at preserving and/or restoring the quality of major surface and ground water bodies.

STUDY TITLE	Special Research Assignments	DIV OR ORG NWRI
KEY WORDS	REGIONS, SPECIAL PROJECTS	SEC'N OR GRP RESRCH
STUDY LEADER	Rodgers, G.K.	TEL: 637-4625 PAE 1716
TEAM MEMBERS		DATE 82/12/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research	

Goals

To provide a reasonable degree of support for regional programs and deserving new initiatives that arise during the fiscal year.

Performance Indicators

Support to regional programs and new initiatives.

Justification

To provide support for unanticipated needs without disrupting the allocations already made.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83- 109

STUDY TITLE	Habitat Studies	DIV OR ORG
KEY WORDS	AQUATIC ENVIRONMENTS	SEC'N OR GRP
STUDY LEADER	Sly, P.G.	PAE 1714 TEL: 613-476-6556
TEAM MEMBERS		DATE 82/10/29
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To define characteristics of spawning/nursery habitats suitable for use by Great Lakes whitefish and lake trout, and to determine factors which influence successful use or failure of such sites.

Performance Indicators

1. Completion of descriptive reports covering spawning site studies in Lake Superior, Georgian Bay and Lake Ontario.
2. Preparation of manuscripts describing factors which influence success/failure of spawning site use by lake trout.
3. Preparation of manuscript describing what is known about whitefish spawning in Lake Ontario and possible controlling factors.

Justification

Completion phase I co-operative study with OMNR (and USF&W and NYDEC agencies), initiated in response to ecosystem concept of revised GLWQA, the GLEER report of GLFC, and the OMNR-SPOF report.

STUDY TITLE	Lacustrine Sediments	DIV OR ORG NWRI
KEY WORDS	SEDIMENTS	SEC'N OR GRP RESRCH
STUDY LEADER	Sly, P.G.	TEL: 613-476-6556 PAC 1714
TEAM MEMBERS		DATE 82/10/29
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

Interpretation of regional sediment data, previously obtained, from the Kingston Basin of Lake Ontario and from Georgian Bay.

Performance Indicators

1. Completion of manuscript describing sedimentological-geochemical relationships of deposits in the Kingston Basin of Lake Ontario, and possible significance of benthos distributions.
2. Completion of manuscript describing similar relationships in Georgian Bay.
3. Preparation of manuscript describing significance of particle-size relationships of the Great Lakes silt-clay size fraction.

Justification

Completion of interpretations related to sediment/water interaction at selected sites, characteristic of high and low "cultural impact". Studies initiated under terms of GLWQA.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83- 115

STUDY TITLE	Science Liaison Office	DIV OR ORG NWRI
KEY WORDS	MANAGEMENT, ADMINISTRATION, BUDGET, PLAN, COORDINATION, INTERNATIONAL JOINT COMMISSION, PROGRAM DOCUMENTATION, ENVIRONMENTAL IMPACT STATEMENT	SEC'N OR GRP BRANCH
STUDY LEADER	Bondy, D.A.	PAE 1910
TEAM MEMBERS	D. Burford and NWRI Management Team - Programs	DATE 82/12/02
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Offices of the DG, Directors and their immediate staff.	

GoalsPerformance Indicators

1. Coordinate NWRI Study Planning.
2. Liaison with IWD Headquarters.
3. Liaison with other parts of DOE.
4. Staff Officer to Director for Committee Responsibilities.
5. Water Research Needs Identification.
6. Respond to information requests.

1. Complete 1984-85 Study Plans by March 1984 and publish Directory.
2. Coordinate such topics as WRAC, WRRSP, Unsolicited Proposals, PDF's. Provide secretariat support to NHRI-NWRI Research Coordination Committee, Member of IWD Planning Systems Committee.
3. Coordinate such topics as GLWQP, LRTAP, TCMP, EARP, Canadian Climate Program, Energy and Environment.
4. Provide support to Director for SAB/IJC, IWD Directors, Regional Directors (Ont.), ECS Directors, etc., meetings.
5. Continuous updating of the research needs list. Improvement of the mechanisms to identify needs, their prioritization and subsequent NWRI response/technology transfer.
6. Provide information on Scientific programs and arrange visits to NWRI (in both official languages).

Justification

To promote efficiency, effectiveness and relevancy in NWRI Water Management Research.

STUDY TITLE	Management and Scientific Advice	DIV OR ORG
KEY WORDS	ADMINISTRATION, MANAGEMENT, REGIONS	SEC'N OR GRP
STUDY LEADER	Daley, R.J.	TEL: (604)926-2567 PAE 1714
TEAM MEMBERS	C.H. Pharo, C.B. Gray, M. Bothwell and E.C. Carmack	DATE 83/02/21
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Provision of leadership in workplan execution, strategic and long-term research planning, branch administration and public information activities.
2. Advice on matters relating to limnology and river ecology in region and to NWRI-HQ.

Performance Indicators

1. Complete workplan goals; participate in NWRI-HQ strategic planning exercise (3 trips); plan and negotiate 1984-85 research agreements with Weycan and NWRI-HQ; control branch budget and do employee appraisals; undertake information activities, as directed.
2. Provide timely response, as requested, on EARP and EPS referrals, technical requests from B.C. - MOE and DFO, CWA studies, grant proposals and journal reviews.

Justification

Efficient management of branch programs, provision of common support needs and advisory input, as requested, on science of regional freshwaters.

STUDY TITLE	Southern Lake Eutrophication	DIV OR ORG
KEY WORDS	EUTROPHICATION, REGIONS, LIMNOLOGY, LAKE RESTORATION, NITROGEN, IMPACT.	SEC'N OR GRP PY/RGN
STUDY LEADER	Gray, C.B.	TEL: (604)926-2567 PAE 1714
TEAM MEMBERS	E.C. Carmack, R. Daley, C. Pharo, S. Jasper, E. Marles, R. Wiegand and R. Kirkland	DATE 83/02/21
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Publish information on the effects of flow alteration and nutrient eutrophication on the limnology of southern B.C. lakes.
2. Evaluation of lime-phosphate precipitation as a cost-effective restoration technique for small eutrophic B.C. lakes (jointly with NWRI-HQ).
3. Research proposal on the feasibility of nitrogen fertilization to restore eutrophic interior B.C. lakes.

Performance Indicators

1. Completion of 8 manuscripts for in-house review on Kamloops, Kootenay and Wood Lakes: 4 by 31 October 1983, and 4 by 31 March 1984.
2. Analytical, logistical and advisory assistance to NWRI-HQ for field program in Okanagan Valley and subsequent data interpretation (2 HQ manuscripts).
3. Written plan for management consideration by February 1, 1984.

Justification

Eutrophication of B.C.'s southern intermontane lakes is a major problem complicated by river impoundment activities. System-specific information on limnological control factors, diagnosis and restoration alternatives is needed for effective lake management.

STUDY TITLE	Thompson River Algal Ecology	DIV OR ORG NWRI
KEY WORDS	ALGAL GROWTH, ECOLOGY, EUTROPHICATION, PHOSPHORUS, REGIONS, RIVERS.	SEC'N OR GRP PY/RGN
STUDY LEADER	Bothwell, M.L.	TEL: (604)926-0811 PAE 1714
TEAM MEMBERS	S. Jasper, K. Suzuki, M. Bolin and R.J. Daley	DATE 83/02/21
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Publish results of previous phases of Thompson River Research.
2. Multi-trough facility constructed, tested and operational.
3. Biological methods tested and calibrated for multi-trough experiments.
4. Completed fall and winter experiments on phosphorus-algal growth interactions in the S. Thompson River.

Performance Indicators

1. Data report on S. Thompson site-selection study and one journal manuscript by 1 June 1983, a second manuscript by 1 September 1983.
2. Troughs, incubator and field lab tested operational by September 30, 1983.
3. ^{14}C , ^{32}P uptake, DNA, AP ase and ATP methods in place by September 30, 1983.
4. Two major field experiments commencing October 1, 1983 and completed by 31 March, 1984.

Justification

River eutrophication (nuisance algal infestations) is a widespread problem in B.C. and Canada, but remedial action is hampered by the lack of predictive methods to quantify algal-growth/phosphorus-supply relationships. This study, using novel flowing troughs, is a response to Federal/Provincial study requests and is supported by private industry.

STUDY TITLE	Northern Hydro Limnology (Yukon)	DIV OR ORG NWRI
KEY WORDS	LIMNOLOGY, SEDIMENTATION, NUTRIENTS, MICROBIOLOGY, ICE, CLIMATE, ENERGY, IMPACT	SEC'N OR GRP PY/RGN
STUDY LEADER	Pharo, C.H.	TEL: (604)922-6912 PAE 1714
TEAM MEMBERS	E.C. Carmack, C.B. Gray, R. Wiegand, R. Kirkland and E. Marles	DATE 83/02/21
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Synoptic description of general limnological characteristics of the four Yukon headwater lakes from 1981-83 studies.
2. Information on riverine circulation and sedimentation during summer in the Yukon headwater lakes as affected by inflow temperature and suspended sediment load.
3. Preliminary data on the compositional variability of suspended sediments in relation to nutrient status of Yukon headwater lakes.
4. Information on riverine circulation, nutrient utilization, and microbial activity under winter ice-cover in Lake LaBerge (jointly with NWRI-HQ).
5. Documentation of hydrological meteorological and limnological conditions controlling the annual ice cycle in a coupled river-lake system (jointly with WRB-PY)

Performance Indicators

1. 2 reports or manuscripts on physics/ sedimentology and chemistry/microbiology by 31 March 1984.
2. Manuscript on Kluane Lake "sinking plume" (from 1982 study) by October 31, 1983; temperature and turbidity data on Lake LaBerge "buoyant plume" reduced and on file by 31 October 1983.
3. Sediment collection method operational by 1 June 1983; field reconnaissance complete by 1 October 1983 with reduced data on file by 31 March 1984.
4. Reduced data from 1983 winter study on file by 31 December 1983; if required, follow-up 1984 field work complete by April 30, 1984.
5. Study plan, collaborative arrangements, methods and instrumentation in place to carry out Lake LaBerge-Yukon River field program from freeze-up, 1983 to spring break-up, 1984.

Justification

Northern B.C. and the Yukon have enormous long-term hydroelectric potential. However, almost nothing is known about the limnology of the large ice-covered lakes of the region. This project is in response to the ECS priority for "research into the impacts of hydroelectric development in northern areas".

STUDY TITLE	Pathways, Fate & Biological Impact of Toxics in Prairie Lakes & Rivers	DIV OR ORG NWRI
KEY WORDS	TOXIC CHEMICALS, BIOGEOCHEMISTRY, BIOLOGY, BENTHOS, INVERTEBRATES, PATHWAYS, RIVERS, LAKES	SEC'N OR GRP WN/RGN
STUDY LEADER	Jackson, T., Warwick, W..	TEL (204)269-7379 PAE 4200
TEAM MEMBERS	E. Ongley, C. Casey, J. Tisdale, K. Supeene	DATE 83/01/25
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

Determine pathways, fate and biological impact of toxic chemicals in prairie lakes and river systems and report results to the Toxic Chemicals Management Program.

Performance Indicators

- Assist EPS in summer/83 sampling program for priority pollutants in the N. Saskatchewan River for a maximum of four weeks.
- Complete laboratory experiments on microbial transformations of mercury by March 31/84.
- Complete metal speciation analyses on sediment and plant materials from the Qu'Appelle system by Mar. 31/84.
- Complete preparation and mounting of chironomid larval specimens from selected sites in Tobin Lake and comparative prairie lakes, by March 31/84.
- Report results of activities above to TCMP by March 31/84.

Justification

Research Needs as identified in DOE, and IWD Strategic Plans and in IWD Long Term Operational Plan.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-174

STUDY TITLE	Origin & Pathways of Mercury in Manitoba Reservoirs & Qu'Appelle	DIV OR ORG NWRI
KEY WORDS	MERCURY, HEAVY METALS, BIOAVAILABILITY BIOGEOCHEMISTRY, RIVERS, WATER QUALITY	SEC'N OR GRP WN/RGN
STUDY LEADER	Jackson, T.	TEL:(204)269-7379 PAE 1500.
TEAM MEMBERS	E. Ongley, W. Warwick, J. Tisdale, K. Supeene	DATE 83/01/25
ECS PROGRAM	River Basin Implementation	
ACTIV ELEM	River Basin Plan Implementation.	

Goals

Finalize studies of bioaccumulation, pathways and mercury species in South Indian Lake and in the Qu'Appelle River/Lake system as defined under the various CWA agreements, for the purpose of identifying sources and predicting future trends.

Performance Indicators

- Submit final report on Project 2.2 (Bioaccumulation Processes), by June 30/83 (subject to availability of data)/
- Let a contract for experimental studies of mercury methylation/demethylation of S.Indian Lake sediments, by July 30/83.
- Complete field program for Project 2.3 (Biogeochemistry of Sediments) and for the Qu'Appelle program by Oct.31/83.
- Submit final report to each study authority (Qu'Appelle Implementation Board and N.Manitoba Mercury Cttee. re Project 2.3), by March 31/84.
- Write and submit two additional papers on heavy metal cycling, by March 31/84.

Justification

To fulfil I.W.D. commitments to the Provinces of Manitoba and Saskatchewan under the terms of Canada Water Act agreements.

STUDY TITLE	Prairie Lakes Physics	DIV OR ORG NWRI
KEY WORDS	AQUATIC PHYSICS, DATA MANAGEMENT, MODELS, PHYSICAL LIMNOLOGY	SEC'N OR GRP WN/RGN
STUDY LEADER	Kenney, B.	TEL: (204)269-7379 PAE 1712
TEAM MEMBERS	J. Mollison	DATE 82/01/25
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

Goals

Develop and calibrate physical systems theory for chemical response in shallow lakes for prairie lake applications.

Performance Indicators

- Complete theoretical analysis and analytical development of the model by July 31/83
- Complete all computer programming and debugging by Sept.30/83.
- Complete all Qu'Appelle Lake(s) simulation by Nov.31/83
- Provide detailed listing of technical requirements and support levels from CCIW for further experimental work, if required by Nov.31/83.
- Complete data synthesis and write final report by March 31/84.
- Write and submit for publication three additional papers/reports by March 31/84.

Justification

Research requirement to meet I.W.D. program requirements for water management in prairie locations.

STUDY TITLE	The Tobin Lake Project	DIV OR ORG NWRI
KEY WORDS	BIOASSAY, BIOAVAILABILITY, CONTAMINANTS, TOXIC SUBSTANCES, METHODS DEVELOPMENT, ECOTOXICITY	SEC'N OR GRP WN/RGN
STUDY LEADER	Ongley, E.	TEL: (204)269-7379 PAE 4200
TEAM MEMBERS	W. Warwick, D. Birkholz, M. Samoiloff	DATE 83/01/25
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

Develop bioassay and chemical protocol for ecotoxicity assessment in aquatic systems by adopting an integrated program approach with IWD, EPS and University of Manitoba.

Performance Indicators

- Complete toxicity testing by nematode and Ames tests on all fractions (1-8) of samples from Sites 2,5,9 & 17, by March 31/84.
- Complete toxicity testing on sub-fractions from selected toxic fractions (mutagenic or lethal) of Sites 2,5,9 & 17, by March 31/84.
- Evaluate cause and effect inter-relationships between toxic contaminants and biological community response at a primary level of sophistication for Sites 2,5,9 & 17, by March 31/84.
- Identify toxic organic chemical constituents in sample subfractions at Site 9, by March 31/84.
- Carry out necessary coordination and management functions for the Tobin Lake integrated study.

Justification

Research need identified by Regional Toxic Substances Committee, and in DOE/IWD Strategic Plans.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83- 180

STUDY TITLE	Cultural Impact on Benthic Communities of the Qu'Appelle River Lakes	DIV OR ORG NWRI
KEY WORDS	BENTHOS, CONTAMINANTS, NUTRIENTS, TOXICITY, WATER QUALITY	SEC'N OR GRP WN/RGN
STUDY LEADER	Warwick, W.	PAE 1500 TEL: (204)269-7379
TEAM MEMBERS	C. Casey	DATE 83/01/25
ECS PROGRAM	River Basin Implementation	
ACTIV ELEM	River Basin Plan Implementation	

Goals

Continue comparative study of benthic community structure of the Qu'Appelle River Lakes by obtaining contract identification of gastropod specimens and writing one scientific paper. Work will be expanded if funding application to Qu'Appelle Implementation Board is successful.

Performance Indicators

- Let a contract for identification of gastropods by May 31/83.
- Write and submit for publication a research paper on indexing of morphological abnormalities in chironomid larvae, by Dec.31/83.
- Evaluate gastropod data and recommend by March 31/84, any further work which may be required.
- Submit final report on effects of toxic stress on benthic communities to Qu'Appelle Implementation Board by March 31/84, if study is funded.

Justification

To meet I.W.D. commitments under the Canada Water Act to the Qu'Appelle River Basin Implementation Agreement.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83- 183

STUDY TITLE	Nutrient and Contaminant Pathways in Prairie Drainage Systems	DIV OR ORG NWRI
KEY WORDS	NUTRIENTS, CONTAMINANTS, FLUVIAL GEOMORPHOLOGY, PATHWAYS, SUSPENDED SEDIMENT DYNAMICS	SEC'N OR GRP WN/RGN
STUDY LEADER	Ongley, E.	TEL: (204)269-7379
TEAM MEMBERS	T. Jackson, J. Tisdale, K. Supeene	PAE 1714
ECS PROGRAM	Water Management Research	DATE 83/01/25
ACTIV ELEM	Aquatic Ecology	

Goals

Complete and report on a study of nutrient and contaminant pathways, transformations, and in-lake conditions in the Qu'Appelle River system, and to commence a study of contaminant pathways in the North Saskatchewan River.

Performance Indicators

- Commence metal speciation studies by Aug. 1/83.
- Complete Qu'Appelle field program by Oct. 31/83.
- Commence phosphorus speciation studies by Nov. 1/83.
- Complete North Saskatchewan River field program by October 31/83, assuming EPS co-support.
- Report finding to relevant funding agencies by March 31/84.
- Write and submit two additional papers/reports for publication by March 31/84.

Justification

Research requirements to meet program requirements identified in IWD Strategic Plan and IWD Long Term Operational Plan.

ENVIRONMENTAL CONTAMINANTS DIVISION

STUDIES FOR ENVIRONMENTAL CONTAMINANTS DIVISION

STUDY LEADER 83/06/15.

SECTION	STUDY	STUDY TITLE	
DIVISION	200	ENVIRONMENTAL CONTAMINANTS DIVISION MANAGEMENT AND ADMINISTRATION	ALLAN, R. J.
	201	ENVIRONMENTAL CONTAMINANTS DIVISION COMMITTEE INVOLVEMENT	ALLAN, R. J.
	202	MAJOR CAPITAL EQUIPMENT PLAN	ALLAN, R. J.
INORGANICS	230	SOURCES, SPECIATION AND CONCENTRATION OF ORGANOTIN AND ORGANOLEAD	CHAU, Y. K.
	231	HYDROGEOCHEMICAL RESPONSES OF TURKEY LAKES TO ACID RAIN	JEFFRIES, D. S.
	232	AVAILABILITY, TRANSPORT AND REMOVAL OF TRACE ELEMENTS IN LAKES/STREAMS	LUM, K. R.
	233	FATE OF ORGANOTINS IN AQUATIC SYSTEMS	MAGUIRE, R. J.
	234	AVAILABILITY OF TRACE METALS IN SUSPENDED/BOTTOM SEDIMENTS	LUM, K. R.
	235	GEOCHEMICAL CONTROLS OF AQUATIC SYSTEM RESPONSE TO ACID RAIN	JEFFRIES, D. S.
		PARTICLE SIZE/COMPOSITION EFFECT ON TOXICS CONCENTRATION IN SEDIMENT	MUDROCH, A.
ORGANICS PATHWAYS	220	HISTORICAL CONTAMINATION OF L. ONTARIO BY ORGANICS FROM NIAGARA R.	FOX, M. E.
	221	FATE AND IMPACT OF EFFLUENTS ON AN ECOSYSTEM	SCOTT, B. F.
	222	UTILIZATION OF CHEMICALS BY PROTOZOA	SCOTT, B. F.
	223	ACCUMULATION AND EFFECTS OF CONTAMINANTS IN AQUATIC BIOTA	MCALFE, J. L.
	224	EVALUATION OF ENVIRONMENTAL DISTRIBUTION OF TOXICS IN MODEL ECOSYSTEMS	STRACHAN, W. M. J.
	225	ACCUMULATION/DEGRADATION OF ORGANIC CONTAMINANTS IN FLUVIAL SYSTEMS	CAREY, J.
ORGANICS PROPERTIES	210	CORRELATION AND PREDICTION OF CONTAMINANT HAZARDS	KAISER, K. L. E.
	211	THE BIOAVAILABILITY OF ORGANIC CONTAMINANTS IN SEDIMENT	OLIVER, B. G.
	212	ORGANIC CONTAMINANT SOURCES IN THE GREAT LAKES BASIN	KAISER, K. L. E.
	213	CHLORINATED HYDROCARBONS IN SEDIMENTS AND BIOTA OF THE GREAT LAKES	OLIVER, B. G.
	214	MICROBIAL TRANSFORMATIONS OF PCB	BAXTER, R. M.
	215	DEGRADATION RATES AND PRODUCTS OF ORGANIC CONTAMINANTS BY BACTERIA	LIU, D.
	216	CHEMISTRY OF CHLORINATED HYDROCARBONS AT THE AIR/WATER INTERFACE	PLATFORD, R. F.
	217	TOXICITY AND BIODEGRADABILITY OF ORGANIC CONTAMINANTS BY EUKARYOTS	KWASNIEWSKA, K.
RADIONUCLIDES	240	TRENDS IN RADIOACTIVE CONTAMINANTS IN THE GREAT LAKES	DURHAM, R. W.
	241	RADIUM-226 PATHWAYS - PORT GRANBY WASTE MANAGEMENT SITE TO L. ONTARIO	DURHAM, R. W.
	242	RADIONUCLIDE PATHWAYS IN THE NIAGARA RIVER AND LAKE ONTARIO	JOSHI, S. R.
	243	AQUATIC PATHWAYS OF RADIONUCLIDES RELEASED BY URANIUM MINING	JOSHI, S. R.

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA M			EXTERNAL			SHADOW			TOTAL RESOURCES				
	PY SAL	GM	CAF	FY SAL	GM	CAP	FY SAL	GM	CAP	OUTM	PY SAL	AGCY	PY SAL	OM	CAP COST	PY SAL	OM	CAP	TOTAL COST				
232	•50	17	6.5	--	--	--	--	--	--	--	--	--	--	--	--	.50	17	6.5	--	23.5			
233	1.50	49	12.0	10.0	--	--	--	--	--	--	--	--	--	--	--	1.50	49	12.0	10.0	71.0			
234	•50	17	5.0	7.0	--	--	--	--	.55	16	.7	--	2.6	--	--	21.0	19.1	52.0	1.05	36	26.7	26.1	
235	•90	36	6.0	5.0	•50	17	3.6	15.0	•30	9	4.0	--	2.4	--	--	--	1.0	1.70	6.4	23.6	20.0		
235	•90	32	11.5	18.0	--	--	--	--	•45	13	5.5	--	4.6	--	--	18.0	16.2	1.35	49	17.0	36.0	109.0	
236	•90	32	11.5	18.0	--	--	--	--	•45	13	5.5	--	4.6	--	--	18.0	16.2	1.35	49	17.0	36.0	120.6	
240	1.80	53	--	15.0	•13	3	•4	--	--	--	--	--	•05	2	--	--	--	1.95	5.8	•4	15.0	73.1	
241	1.20	42	--	--	--	--	--	--	.04	1	.3	--	.3	--	--	18.0	--	.6	1.24	4.3	18.3	--	
241	1.70	54	--	--	--	--	--	--	--	--	--	--	--	--	--	10.0	12.0	1.70	54	10.0	12.0	76.0	
243	•20	8	10.0	10.0	--	--	--	--	--	--	--	--	--	--	--	--	30.0	--	.24	8	40.0	10.0	58.0
	34.00	1227	290.0	225.0	1.15	39	8.0	18.0	3.39	25.0	--	20.0	.25	8	7.90	90	340.0	84.1	98.0	47.19	663.0	327.1	2586.4

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-200

STUDY TITLE	Environmental Contaminants Division Management and Administration	DIV OR ORG ECD
KEY WORDS	MANAGEMENT, ADMINISTRATION	SEC'N OR GRP ECDDIV
STUDY LEADER	Allan, R.J.	TEL: 637-4678
TEAM MEMBERS	E. Kerr, B. Monaghan, F. Boyd (SSD)	PAE 4200
ECS PROGRAM	M.R.C. Toxic Substances	DATE 82/10/29
ACTIV ELEM	Toxic Chemicals	

Goals

Plan, organize, manage and control the scientific and administrative program of the Environmental Contaminants Division.

Performance Indicators

- a) Provide secretarial services, administrative services, staff training, conference and program travel, telephone services, equipment and building repairs, publication and journal reprint charges, freight and brokerage costs, photocopier services, stores and word processing services.
- b) Coordinate study plan preparation, (quarterly written study progress); liaison with other federal, provincial, private agencies, and research grant reviews.
- c) Prepare staff appraisal and promotion documents.
- d) Convene regular section meetings, other impromptu meetings as required for program development, biennial verbal discussions of projects with project leaders.

Justification

To promote efficiency, effectiveness and economy in the Division's projects and administration of A-Base and external funding under GLWQA, LRTAP, and TCMP.

STUDY TITLE	Environmental Contaminants Division Committee Involvement	DIV OR ORG ECD
KEY WORDS	CONTAMINANTS, COMMITTEES	SEC'N OR GRP ECDDIV
STUDY LEADER	Allan, R.J.	TEL: 637-4678 PAE 4200
TEAM MEMBERS	Division staff as required and approved by Division Chief	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To act on committee to: a) review study proposals and allocate external funds; b) review data, criteria documents, guidelines and provide advice or prepare integrated reports dealing with environmental contaminants.

Performance Indicators

1. Canada/US Niagara River Study - Allan/Mudroch
2. Canada/Ontario English-Wabigoon Mercury Study - Allan
3. GLWQA, Lakes Toxic Contaminant - Allan/Strachan
4. GLWQA, Aquatic Ecosystems Objectives - Strachan
5. DOE/NHW-Toxic Chemicals Committee - Strachan
6. Sweden- ESTHER (Toxic Chemical Assessment) Evaluation - Strachan
7. CCIW Dioxin Working Group - Carey
8. LRTAP Algoma Watershed Steering Committee - Jeffries/Allan
9. ECA Evaluation Committee - Maguire/Strachan
10. Ontario Region, Quirke Lake Tailings Disposal Study Group - Durham
11. DOE Ontario Shell Energy Team - Scott
12. International Standards Organization - Scott
13. AGRAD Working Group on Fate of Oil - Nagy/Scott
14. ASTM Oxygen Uptake Group - Liu
15. Un-FAO Marine Fouling Group - Liu
16. Standards Council of Canada - Chau/Liu
17. IJC - SAB Task Force on Non-phosphate Detergents - Kaiser
18. GLWQA Capital Equipment - Carey
19. CCIW Capital Equipment Replacement - Semkin
20. NWRI Management Team - Allan
21. CCIW Library - Scott
22. NWRI Newsletter - Kerr
23. CCIW Safety - Tkacz
24. CCIW Cafeteria - Livermore

Justification

Technology transfer.

STUDY TITLE	Major Capital Equipment Plan	DIV OR ORG ECD
KEY WORDS	CAPITAL, EQUIPMENT	SEC'N OR GRP ECDDIV
STUDY LEADER	Allan, R.J.	TEL: 637-4678 PAE 4200
TEAM MEMBERS	Division Staff	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

See individual studies.

Performance Indicators

Major capital items can only be purchased at a Division level. Only rarely are individual studies of a nature which can justify large expenditures for items unique to one investigation.

In ECD, the technical to professional ratio is too low for historical reasons. The objectives in 1983/84 will be to compensate for this by purchasing:

- a) automatic sample processors for existing equipment;
- b) plotters and computerised data reduction systems.

Justification

Economical management of ECD Capital from internal and external funding.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-210
1509

STUDY TITLE	Correlation and Prediction of Contaminant Hazards	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, TOXICITY, STRUCTURE, GREAT LAKES	SEC'N OR GRP OPROPS
STUDY LEADER	Kaiser, K.L.E.	TEL: 637-4244 PAE 4200
TEAM MEMBERS	M. Comba, J. Ribo (PDF), D. Liu; in collaboration with P. Hodson (GLFRB), G. Dixon (UOW), J. Cullen	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To select, prepare, purify model chemicals for toxicity studies by collaborators.

To analyze toxicity data by QSAR and to correlate and predict such data from QSAR equations.

To use existing molecular orbital calculations to predict physico-chemical parameters of contaminants.

To develop new method for the computation of physico-chemical parameters.

Performance Indicators

One paper on QSAR of various fish toxicity data. Nov. 83.

One paper on QSAR of fungi and bacteria toxicity data. Aug. 83.

One paper on rotation barriers of PCB's. April 83.

One report on an ab initio model for the calculation of molecular properties. April 83.

Justification

Detailed justification is given in the QSAR research proposal by Kaiser and Hodson, (Oct. 81) showing the relevance to IWD, GLWQA, and TCMP programs.

STUDY TITLE	The Bioavailability of Organic Contaminants in Sediment	DIV OR ORG ECD
KEY WORDS	BIOAVAILABILITY, SEDIMENTS, CONTAMINANTS, ORGANICS, GREAT LAKES	SEC'N OR GRP OPROPS
STUDY LEADER	Oliver, B.G.	TEL: 637-4604 PAE 4200
TEAM MEMBERS	M. Matteliano	DATE 82/10/29
ECS PROGRAM	M.C.R. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Laboratory experiments on naturally contaminated and spiked sediments
 - measure the temperature effects of pollutant leachability by lake water.
 - measure the biological uptake of pollutants from leached and unleached sediments by oligochaete worms using aquaria.
2. Analysis of field populations of macroinvertebrates and associated sediments to see whether there is any correlations between animal and sediment concentrations.

Performance Indicators

1. Assessment of what fraction of organic pollutants in naturally contaminated and in spiked sediments are available to the biological community
2. To find out whether or not laboratory results can be applied to the field

Justification

The presence of persistent organic contaminants in Great Lakes sediments is well documented. It is important to find out what portion of this material is readily available to the biological community and what portion has, in effect, been removed from the system by association with the sediments. Input to Toxic Chemicals Fate modeling and GLWQ Agreement.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-212

STUDY TITLE	Organic Contaminant Sources in the Great Lakes Basin	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, DETROIT RIVER, LAKE SUPERIOR, ORGANICS, SEDIMENTS, FISH, NIAGARA RIVER	SEC'N OR GRP OPROPS
STUDY LEADER	Kaiser, K.L.E.	TEL: 637-4244 PAE 4200
TEAM MEMBERS	M.E. Comba Summer students	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To collect, process, and analyze water samples for headspace volatiles and to determine other contaminants by GC and GCMS investigations on sediment and fish samples from the Great Lakes.

Performance Indicators

Report on Detroit River volatiles, May 83.
 Report on Niagara River plume volatiles, April 83.
 Report on Lake Superior volatiles Dec. 83.

Justification

Previous research (Kaiser and Comba, J. Great Lakes Res., in press) has shown the usefulness of headspace analyses for the detection of contaminant sources. This is a prerequisite for toxic substances control and therefore part of IWD, GLWQ and TCMC mandates.

STUDY TITLE	Chlorinated Hydrocarbons in Sediments and Biota of the Great Lakes	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, SEDIMENTS, FISH, LAKE ONTARIO, LAKE ERIE, LAKE HURON, LAKE SUPERIOR, NIAGARA R.	SEC'N OR GRP OPROPS
STUDY LEADER	Oliver, B.G.	TEL: 637-4604 PAE 4200
TEAM MEMBERS	K. Nicol	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

- a) Analyses of PCB congeners and other chlorinated hydrocarbons in Lakes Ontario, Erie, Huron and Superior sediments.
- b) Correlation of compound distribution with chemical/physical properties of the chemicals.
- c) Compound distribution maps for use in identifying sources.
- d) Sediment core studies.
- e) Analyses of Great Lakes fish and other biota.
- f) Laboratory studies on the uptake and excretion of model compounds and common pollutants by fish.

Performance Indicators

- a) Compound distributions maps.
- b) Predictive distribution models.
- c) Pollutant source identification.
- d) Historical loading patterns.
- e) Identification of compounds which bioaccumulate and could pose a hazard to the ecosystem or to human health.
- f) Prediction of concentrations in field fish.

Justification

Compound specific analysis of water, sediments and biota for PCB's and other chlorinated hydrocarbons having a wide range of physical and chemical properties will enable us to develop a better understanding of what factors control environmental distributions. Input to GLWQ Program and Toxic Chemicals Fate Modeling.

STUDY TITLE	Microbial Transformations of PCB	DIV OR ORG ECD
KEY WORDS	PCBs, MICROBIAL TRANSFORMATIONS	SEC'N OR GRP OPROPS
STUDY LEADER	Baxter, R.M.	TEL: 637-4506 PAE 4200
TEAM MEMBERS	D. Sutherland	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

The bacterial degradation of chlorinated biphenyls is not usually complete. The further reactions that the metabolic products may undergo are therefore a matter of interest. One type of reaction, photochemical degradation, is the subject of this 1983 study. Preliminary observations have indicated that another type of reaction is possible, namely polymerization of metabolites to insoluble substances. In nature, these will presumably be deposited in the sediments.

The study will attempt to determine which chlorinated biphenyls undergo reactions of this kind, and what is the nature of the products formed.

Performance Indicators

Progress of the study will be indicated in periodic reports, and a paper will be prepared for publication on completion of the study (Probably mid-1984).

Justification

PCB's are a matter of concern to TCMC and GLWQ-TC Program. Little is known however, of the mechanisms involved in their degradation. In particular, the possible interaction of biochemical and other processes in their transformation has been largely ignored.

STUDY TITLE	Degradation Rates and Products of Organic Contaminants by Bacteria	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, DEGRADATION, TOXICITY, ORGANICS, STRUCTURE-ACTIVITY, FIELD STUDY	SEC'N OR GRP OPROPS
STUDY LEADER	Liu, D.	TEL: 637-4576 PAE 4200
TEAM MEMBERS	K. Thomson, K. Kwasniewska, K. Kaiser	DATE 82/10/29
ECS PROGRAM	M.C.R. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To determine the toxicity and biodegradability of "model" chemicals and chemicals of environmental concern, particularly heterocyclic compounds, with the emphasis on the identification of degradation products.

To expand in situ experiments and compare the results with laboratory studies.

Performance Indicators

One paper on bacterial toxicity data. October 1983.

One paper on microbial degradation of chemical with environmental concern. January 1984.

One paper on bacterial toxicity data regarding structure-activity. March 1984.

Justification

Studies are under the general area of hazard assessment of toxic substances, an aspect of the Environmental Contaminants Act.

STUDY TITLE	Chemistry of Chlorinated Hydrocarbons at the Air/Water Interface	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, CHLORINATED HYDROCARBONS AIR/WATER INTERACTION	SEC'N OR GRP OPROPS
STUDY LEADER	Platford, R.F.	TEL: 637-4252 PAE 4200
TEAM MEMBERS	R.J. Maguire R.J. Tkacz	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To measure the partitioning and transport of selected hydrocarbons (benzothiazoles, lindane, DDT and HCB) in and through the surface layer between water and air, both in the laboratory and in small lakes and rivers. To assess the importance of surface water microlayers as reservoirs for pollutants.

Performance Indicators

Report due 1983 on results and field work from 1982.

Justification

Under general area of transport of halogenated hydrocarbons across the air/water interface. Input to Toxic Chemical Models - Volatilization.

STUDY TITLE	Toxicity and Biodegradability of Organic Contaminants by Eukaryots	DIV OR ORG
KEY WORDS	TOXICITY, BIODEGRADATION, CONTAMINANTS, STRUCTURE ACTIVITY, ORGANICS	SEC'N OR GRP OPROPS
STUDY LEADER	Kwasniewska, K.	TEL: 637-4576 PAE 4200
TEAM MEMBERS	K. Kaiser, D. Liu	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. To investigate the toxicity and biodegradability of organic chemicals using eukaryotic cells of yeast or yeast like fungi.
2. To compare the experiment results with those derived from the bacterial culture.

In continuation of toxicity and biodegradation studies, eukaryotic yeasts or yeast-like fungi will be used as the test organisms. These microorganisms are ubiquitous in aquatic ecosystems and have been shown to possess a wide tolerance to various environmental conditions, such as temperature, moisture, range of pH, and high osmotic pressure. In addition, yeasts have a greater genetic complexity than bacteria and also a relatively short life cycle. This should make them useful for toxicity and biodegradation studies. Emphasis will be placed on structure-activity correlations of the observed effects with physico chemical parameters as well as on the identification of major metabolites.

Performance Indicators

One paper on yeasts (toxicity) November 83.

One paper on yeast or yeast like fungi, degradation of chemicals with environmental concern, Feb 84.

Justification

Chemicals when released into the environment, especially if persistent, can have a cumulative and serious effect on all biota, including humans (DOE Strategic Plan 1982).

Investigations on the toxicity and biodegradability of such substances are relevant to hazard assessment, an aspect of the Environmental Contaminants Act (ECA).

STUDY TITLE	Historical Contamination of L. Ontario by Organics from Niagara R.	DIV OR ORG ECD
KEY WORDS	NIAGARA RIVER, LAKE ONTARIO, PERSISTENCE, ORGANICS, SEDIMENTS, SUSPENDED SOLIDS	SEC'N OR GRP OPATHS
STUDY LEADER	Fox, M.E.	TEL: 637-4244 PAE 4200
TEAM MEMBERS	J. Carey, R. Bourbonniere, B.G. Oliver, E. Halfon, H. Huneault, L. Coletta.	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Present contamination of Lake Ontario by persistent organics from the Niagara R. will be examined by collecting specific size fractions of suspended solids from the lower Niagara R. Biological components of the fractions will be identified and enumerated and the samples analyzed for selected contaminants.
2. Historical contamination of L. Ontario will be determined by examining 0.5 cm sections of cores at a limited number of sites throughout L. Ontario to a depth of at least 6 cm. The same contaminants as in (1) will be analyzed (mainly OC's).
3. Attempts will be made to incorporate the data produced from (1) & (2) into a mathematical model which will attempt to predict trends from the past to the near future for the persistent contaminants in the lake system.

Performance Indicators

1. 10 fractions of suspended solids collected April, July & October 1983.
Analysis of fractions for OC contaminants Dec. 83.
Contract biological ex. of 1 set Fall 1983.
2. 1 coring cruise summer 1983 subsecting immediately following collection. Sample analyses for OC's, etc.- Fall 83.
3. Data reduction, analysis & modelling - winter 1983.
Paper and/or presentation for conference - spring 1983.

Justification

Previous studies (Durham and Oliver, 82) have shown that the contaminant load from the Niagara R. over the years is reflected in L. Ontario sediment profiles. To extend this approach lakewide will provide data of great value to modellers attempting to predict the future status of persistent organic contaminants in Lake Ontario.

STUDY TITLE	Fate and Impact of Effluents on an Ecosystem	DIV OR ORG ECD
KEY WORDS	PHENOLS, PNAs, FATE, IMPACT, CHEMISTRY	SEC'N OR GRP OPATHS
STUDY LEADER	Scott, B.F.	TEL: 637-4225 PAE 4200
TEAM MEMBERS	B.F. Scott, E. Nagy, N. Hart, B. Dutka, J. Sherry M. Charlton, W.D. Taylor, G. Mackie, M. Dickman	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To study the short term fate of phenols and PNAs.

To ascertain the long term fate of phenols and PNAs.

To determine the short term impact of phenols and PNAs on an aquatic ecosystem.

To determine the long term impact of phenols and PNAs on an aquatic ecosystem.

Performance Indictors

After preliminary laboratory studies, four of the ponds will be treated in late July with a synthetic mixture containing phenols and PNA samples of water sediment and biota will be collected on a regular basis to give 216 separate samples to be analyzed for water chemistry (NO_3^- , NO_2^- , NH_3 , TKN, particulate N, particulate C, dissolved carbon, alkalinity, dissolved phosphorus, DRP, Total P, sulphate ion, chloride ion, calcium ion and magnesium ion), phytoplankton, zooplankton, fungi, bacteria, protozoa, and the added chemicals. Additional samples will be collected for replicates. Also, there will be 78 samples collected for chemical, benthos and periphyton analyses.

Report in February 1984.

Justification

Pollution from new energy sources is a departmental priority. The types of compounds to be used in the study would be in the effluent of coal (gasification) or liquification plants.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-222

STUDY TITLE	Utilization of Chemicals by Protozoa	DIV OR ORG ECD
KEY WORDS	BIOACCUMULATION, TOXIC SUBSTANCES, BIOTRANSFORMATION	SEC'N OR GRP OPATHS
STUDY LEADER	Scott, B.F.	TEL: 637-4225 PAE 4200
TEAM MEMBERS	B.F. Scott, J. Hart, E. Nagy, W.D. Taylor	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

To determine the ability of protozoa to:

- a) Accumulate contaminants (lab studies)
- b) Transform contaminants (lab studies)
- c) Accumulate transformation products

Performance Indicators

Preliminary report March, 1984.

Justification

Protozoans are found in freshwater ecosystems. Little is known of their function especially their ability to exist with and transform contaminants. By investigating the possible breakdown of selected chemicals, a better understanding of the fate of these chemicals in the aquatic environment will be achieved.

STUDY TITLE	Accumulation and Effects of Contaminants in Aquatic Biota	DIV OR ORG ECD
KEY WORDS	TOXIC SUBSTANCES, BIOACCUMULATION, HIRUDINEA MOLUSCS, FISH	SEC'N OR GRP OPATHS
STUDY LEADER	Metcalfe, J.L.	TEL: 637-4222 PAE 4200
TEAM MEMBERS	J.H. Carey, R.J. Maguire, M.E. Fox, H. Huneault, R.J. Tkacz, L. Coletta	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Continue studies aimed at establishing the potential of Hirudinea as bio-indicators of contaminants in freshwater systems.
 - a) Leeches will be compared with other sentinel species, especially molluscs, in terms of their bioconcentration potential for various contaminants, both by sampling indigenous species in several polluted locations (eg., Canagagigue Creek, Grand River, Detroit River) and by putting animals from clean locations at polluted sites for fixed time periods.
 - b) The range of contaminants under investigation will be expanded to include metals and associated organometallics in addition to chlorophenols and neutral organochlorines.
2. Continue studies to determine the pathways and accumulation rates of organic contaminants in fish. The importance of food vs. water accumulation pathways will be determined in Canagagigue Creek under controlled conditions using indigenous fish species. The results will be related to observed levels of contaminants in these species from field collections.

Performance Indicators

1. Report on the accumulation of contaminants by freshwater Hirudinea.
2. Report on the pathways and accumulation rates of organic contaminants in fish.

Justification

Toxic substances are a top priority for both the Department and ECS. Investigation into their path ways and fate are specifically referred to.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-224
1506

STUDY TITLE	Evaluation of Environmental Distribution of Toxics in Model Ecosystems	DIV OR ORG ECD
KEY WORDS	COMPUTER, MODELS, DISTRIBUTION, FATE, TOXIC SUBSTANCES	SEC'N OR GRP OPATHS
STUDY LEADER	Strachan, W.M.J.	TEL: 637-4222
TEAM MEMBERS	W.M.J. Strachan and technician (ECD/NWRI) E. Halfon (ASPD/NWRI) V. Zitko (St. Andrews Biological Station /DFO) J.R. Roberts (Envir. Secret./NRC)	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Multivariate analysis of the sensitivity of the outputs of EXAMS, FUGACITY and PERSISTENCE models.
2. Conversion of EXAMS program to Basic Language suitable for operations on "mini" computers.
3. Selection of several benchmark chemicals suitable for evaluation of models - ones with existing environmental data or which can have such readily developed in test systems.
4. Application of benchmark data to test the validity of the model predictions.
5. Examination of the feasibility of developing a flowing stream or other suitable test systems which would be capable of achieving a steady state suitable for evaluating toxic chemicals.

Performance Indicators

1. Contract report FY 1983-4.
2. Contract report and Program listing FY-1983-84.
3. Identification of compounds and a review of existing physical-chemical data, plus presently available environmental data.
4. Possible publication submission in FY 1983-4.
5. A report on feasibility during FY 1983-4.

N.B. Items 1 and 2 are largely contingent on support from TCMC through TOXFUND.

Justification

Computerized models of ecosystems have been recommended as means of estimating the exposure of toxic chemicals in the environment. A concerted evaluation of model structure and output together with the application development and of input data and a comparison with environmental validation data is required to substantiate their predictive ability.

STUDY TITLE	Accumulation/Degradation of Organic Contaminants in Fluvial Systems	DIV OR ORG ECD
KEY WORDS	CONTAMINANTS, TOXIC SUBSTANCES, DEGRADATION, BIOACCUMULATION, FLUVIAL SYSTEMS, PATHWAYS	SEC'N OR GRP OPATHS
STUDY LEADER	Carey, J.	TEL: 637-4693 PAE 4200
TEAM MEMBERS	M. Fox, J. Metcalfe, D. Liu, H. Huneault, L. Coletta	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Continue studies on contaminant pathways in river and creek ecosystems by:
 - a) Expanding the macrophyte and periphyton survey of Canagagigue Creek conducted in FY 82/83 to explain anomalous results by sampling plants of the same species in a variety of micro-habitats. This work to be done in collaboration with S. Painter (AED).
 - b) Complete the description of contaminant levels in Canagagigue Creek benthos by sampling to fill in gaps in existing data and evaluating results to identify the important pathways of accumulation by benthos.
 - c) Continue collaboration with Winnipeg Detachment, NWRI in defining contaminant distributions in Qu'Appelle and other systems in Western Canada and compare these results with those from Canagagigue Creek.
2. Continue studies of degradation pathways of contaminants by:
 - a) Determining the importance of sensitized photolysis in the degradation of TFM in river mouths.
 - b) Complete work on electron transfer degradation of herbicides sensitized by humic acids.

Performance Indicators

1. a) Complete two field trips by Sept. 83.
 b) Conduct several sampling trips and publish report on accumulation in Canagagigue Creek by Sept. 83.
 c) Complete analyses of samples collected by Winnipeg Detachment and complete preliminary evaluation.
2. a) Complete lab work by Mar. 84.
 b) Submit paper on sensitized photochemistry of 2,4-D in natural waters by Oct. 83.

Justification

Toxic substances continue to be the immediate top priority for the Department and ECS. Investigations into the pathways and fate of these substances are specifically referred to.

STUDY TITLE	Sources, Speciation and Concentration of Organotin and Organolead	DIV OR ORG ECD
KEY WORDS	ALKYLTIN, ALKYLLEAD, SPECIATION, TOXICITY, NIAGARA RIVER, DETROIT RIVER, SEDIMENTS, FISH	SEC'N OR GRP INORG'S
STUDY LEADER	Chau, Y.K.	TEL: 637-4707 PAE 4200
TEAM MEMBERS	G.A. Bengert, P.T.S. Wong (GLFRB), A.J. Carty (Waterloo)	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

- Transformation experiments for Pb and Sn will be carried out in laboratory to study the methylation and demethylation reactions as functions of time (persistence) light (photoreaction) and pH (hydrolysis).
- Field work will be carried out in areas where organolead is produced or handled (Niagara River, Maitland, Detroit River, Sarnia, etc). Concentrations of various forms of alkyllead in sediment, water and fish will be studied and also the changes among the various forms investigated.
- Studies of occurrence of alkytin compounds in the environment will continue through a GLWQ fund.
- Studies of methylation mechanisms of lead and tin will continue through a NSERC grant (with A.J. Carty, Waterloo).
- Algal toxicity of organolead and organotin will be studied (with PTS Wong, GLFRB).

Performance Indicators

- Publication expected 1983/84.
- Publication expected 1983/84
- Publication expected 1983/84

Justification

The trialkyllead is the most toxic form of alkyllead, its presence and level in environmental samples either as a result of dealkylation of tetraalkyllead or from methylation of inorganic lead have direct impact on the food chain. A method is now available for the determination of dialkyl- and trialkyllead in water and fish. The presence of significant concentrations of diethyllead and triethyllead have been revealed for the first time in fish caught in high lead areas (Maitland, Ontario., Table 1). Studies of the levels of dialkyllead and trialkyllead species in the environment will contribute to the understanding of the fate and pathways of organolead compounds.

STUDY TITLE	Hydrogeochemical Responses of Turkey Lakes to Acid Rain	DIV OR ORG ECD
KEY WORDS	ACID RAIN, GROUNDWATER, GEOCHEMISTRY, IONIC BUDGET, LRTAP	SEC'N OR GRP INORG'S
STUDY LEADER	Jeffries, D.S.	TEL: 637-4252 PAE 4300
TEAM MEMBERS	R. Semkin, R. Neureuther, N. Seymour, M. Jones	DATE 82/10/29
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

To quantify the hydrogeochemical response of the Turkey Lakes Watershed (TLW) to acidic precipitation using a mass balance approach. The study will focus on determining:

- the "dose-response" relationship for the basin, and
- the important geochemical mechanisms controlling the relationship.

Quantification will be carried out as follows:

- Continue year-round measurement of hydrological budget
- Continue measurement of precipitation, lake, and stream chemistry
- In cooperation with NHRI, assess the importance of groundwater to the hydrological and chemical budgets of TLW.
- Calculate appropriate budgets from data collected in FY82/83.
- From the budgets, describe movement of chemical constituents through the various components of TLW.

Performance Indicators

Data report on stream and lake chemistry for period July 82 - May 83 (Dec 83).
 Data report on stream loading for period July 82 - May 83 (Jan 84).

Report on mass balance of 5 lakes for 81/82 and 82/83 water years (Mar 84).

Justification

Relevant to an objective established by the LRTAP Steering Committee, to determine the mechanisms which control the response of aquatic ecosystems to long-range transport (deposition) of air pollutants.

STUDY TITLE	Availability, Transport and Removal of Trace Elements in Lakes/Streams	DIV OR ORG ECD
KEY WORDS	AVAILABILITY, TRANSPORT, REMOVAL, TRACE ELEMENTS, LAKES, STREAMS, LAKE ONTARIO, SEDIMENT	SEC'N OR GRP INORG'S
STUDY LEADER	Lum, K.R.	TEL: PAE 4200
TEAM MEMBERS	K.R. Lum, J.K. Leslie (GLFRB), COSEP Student and Agency/Contract Staff	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Water, suspended particulates, bottom sediment will be collected from Red Hill Creek downstream of the Upper Ottawa St. dump and the creek mouth in Windermere Basin and Hamilton Harbour. Similar sampling will be done at the mouth of Indian Creek and Grindstone Creek in the Harbour; larval fish will be collected at the creek-lake interfaces.
2. Water and suspended particulates will be collected on transects in Hamilton Harbour and at stations bracketing the ship canal and the Burlington and Hamilton water intakes.
3. Water and suspended particulates will be collected at a single station in the depositional zone of the Western Basin of Lake Ontario.

Performance Indicators

Reports/papers on 1) chemical forms of trace metals in the Western Basin of Lake Ontario (Winter '83). 2) Partitioning and removal of trace metals in Red Hill Creek with special reference to Cadmium (Fall '84).

Sampling Plan (Refer to 1,2,3 above)

1. Monthly sampling for Red Hill Creek. Intensive daily before, during and after two storm events and during a prolonged dry spell at Red Hill Creek. Less frequent at Indian Creek.
2. Only during and after storm events and/or strong S.W. meteorological forcing.
3. Prior to lake stratification, during the stratified period, at the end of the stratified period.

Justification

Data on the partitioning of trace elements between water, particulate material, bottom sediments and biota provides information on actual and potential exposure. Determination of elemental chemical forms (% inorganic, % organic, % colloidal) gives information on physical-chemical properties which regulate their fate and distribution and hence the potential for impact on organisms including man.

STUDY TITLE	Fate of Organotins in Aquatic Systems	DIV OR ORG ECD
KEY WORDS	ORGANOTINS, BUTYLTINS, TRIBUTYLTIN, BIS(TRI-N-BUTYL-TIN) OXIDE (TBTO), PERSISTENCE, FATE, SEDIMENTS, ALGAE, BACTERIA, FISH, WATER, NIAGARA RIVER	SEC'N OR GRP INORGS
STUDY LEADER	Maguire, R.J.	TEL: 637-4225 PAE 4200
TEAM MEMBERS	R.J. Tkacz	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. To determine the persistence and fate of bis(tri-n-butyltin) oxide (TBTO) in aquatic systems by a) examining the microbial transformation of TBTO b) examining algal uptake of TBTO c) starting work on fish uptake/depuration of TBTO.
2. To complete a second survey for butyltins in water, sediments, fish and macrophytes in the Great Lakes basin.

Performance Indicators

1. a) report expected December 1983
b) report expected February 1984
c) no report expected in FY83/84 - work will have just started.
2. Analyses complete in FY 83/84 - report expected January 1984.

Justification

Organotins are toxic chemicals which are used extensively as polyvinylchloride stabilizers, catalysts and pesticides. Little is known of their fate in water; for this reason, organotins are on the Environmental Contaminants Act Category III list (information required on occurrence, fate and toxicity). A detailed memo on all environmental aspects of organotins accompanies the 79/80 forecast for this study.

STUDY TITLE	Potential Availability of Trace Metals in Suspended/Bottom Sediments	DIV OR ORG ECD
KEY WORDS	CHEMICAL AVAILABILITY, TRACE METALS, SUSPENDED SOLIDS, BOTTOM SEDIMENTS, DETROIT RIVER, LAKE ERIE	SEC'N OR GRP INORG'S
STUDY LEADER	Lum, K. R.	TEL: 637-4251 PAE 4200
TEAM MEMBERS	K. R. Lum : Agency/Contact Staff	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

The fate of contaminants including toxic metal ions arising from sources in the Detroit River watershed and their impact on Lake Erie is a current concern for these boundary waters.

Information will be obtained on the concentrations and potential availability of selected trace metals (e.g. Cd, Pb, Ag, Cu, Zn) in:-

- 1) bottom sediments from sites in the Detroit River watershed and
- 2) suspended sediments in the Western Basin of Lake Erie. Chemical speciation of "dissolved" metals will be attempted for as many samples as time and resources permit.

These data will be valuable in an assessment of:-

- 1) degree and extent of metal contamination in the Detroit River System
- 2) the potential for toxic metal exposure to aquatic organisms
- 3) the effectiveness of removal processes by particulate material in the Western Basin of Lake Erie.

Samples will be obtained in May 1983 using the CSS Advent (or similar vessel)
- one week.

Performance Indicators

- 1) Trace metal content of sediments from the Detroit River and its tributaries. N.W.R.I. report (Winter'83).
- 2) Trace metal removal processes and sediment resuspension in Western Basin of Lake Erie. (Fall'84).

STUDY TITLE	Geochemical Controls of Aquatic System Response to Acid Rain	DIV OR ORG ECD
KEY WORDS	ACID RAIN, CONTAMINANTS, BUFFERING CAPACITY, IONIC BUDGET, HUMIC ACIDS	SEC'N OR GRP INORG
STUDY LEADER	Jeffries, D.S.	TEL: 637-4252 PAE 4300
TEAM MEMBERS	R. Semkin, I. Kapolka, PDF	DATE 82/10/29
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

To develop an understanding of the geochemical response of drainage basins and associated lakes to acid precipitation and atmospheric loading of other contaminants. Investigation will focus on delineating the important factors or processes controlling both long and short-term acidification of basins by carrying out the following:

1. Identification and quantification of the major and minor buffering constituents in water, sediments, soils, biota in the Turkey Lakes Watershed (TLW).
2. Investigate the influence of acidic deposition on the material budgets of the TLW. Deviations from the normal will yield information on the factors controlling the degree and rate of acidification in the long term.
3. Investigate factors controlling short term acidification. Work on assessment of snowpack storage and release of acids will be intensified as will investigation of variation in stream and lake pH during spring melt and after major precipitation events.

Performance Indicators

1. Report on bulk precipitation composition and loading at TLW for Sept 81 - May 83 (Sept 83).
2. Report on changes in distribution of acidity within the snowpack during aging and melt (Nov 83).

Justification

Long-range transport of atmospheric pollutants is causing acid precipitation to fall throughout much of southern Ontario, Quebec and the Maritime Provinces. Many of the lakes and rivers within the zone of acid precipitation are poorly buffered and are becoming acidified to the extent that they will no longer support "normal" aquatic life. In particular, the rate of acidification is poorly understood.

STUDY TITLE	Particle Size/Composition Effect on Toxics Concentration in Sediments	DIV OR ORG ECD
KEY WORDS	METALS, ORGANIC CONTAMINANTS, PARTICLE SIZE, SEDIMENTS, COMPOSITION, L. ONTARIO, NIAGARA R., L. ERIE	SEC'N OR GRP INORG
STUDY LEADER	Mudroch, A.	TEL: 637-4389 PAE 4200
TEAM MEMBERS	A. Mudroch, M. Munawar (GLBL) 1 - technician	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Development and testing of a suitable procedure for separation of sufficient quantities of sediment into different particle size fractions.
2. Analyses of particles in each fraction and determination of their composition by electron microscopy, X-ray fluorescence, and X-ray diffraction.
3. Application of bioassay tests to contaminated and clean sediment collected at selected sites in Canadian lakes and rivers (selection depends on the type and degree of sediment pollution).
4. Determination of particle size and composition effect on concentration of selected contaminants in sediment samples.

Performance Indicators

1. Literature and equipment survey for selection of a most suitable method for separation of sediment particles into the following fractions: 200 µm, 63-200 µm, 20-63 µm, 4-20 µm and 4 µm. Collection of sediment at the offshore and nearshore zone in Lake Ontario and Niagara River for testing the selected method.
2. Collection of sediment samples at selected stations from Niagara and Detroit River, Lakes Erie and Ontario and lakes in the Shubenacadie headwaters drainage basin. Separation of the collected sediments into different particle size fractions.
3. Determination of mineralogical composition and concentration of metals and selected organic contaminants will be carried out on each size fraction.

Justification

Under ECS and GLWQA research is directed to investigate the sources and pathways of toxic substances in the aquatic environment. To assess properly the contamination sources and the degree of river/lake sediment pollution, it is necessary to develop a correct procedure for the grain-size effect of the concentration of contaminants in the sediment. The knowledge of association of contaminants with abiotic and biotic particles of different size will help in the understanding of the mechanism and pathways of sediment contaminants in aquatic ecosystems.

STUDY TITLE	Trends in Radioactive Contaminants in the Great Lakes	DIV OR ORG ECD
KEY WORDS	RADIOACTIVITY, GREAT LAKES, SURVEILLANCE, LAKE SUPERIOR	SEC'N OR GRP RANUCS
STUDY LEADER	Durham, R.W.	TEL: 637-4289 PAE 1140
TEAM MEMBERS	S.P. Livermore, E.A. Kokatich, S.R. Joshi, B.G. Oliver	DATE 82/10/29
ECS PROGRAM	Canada, U.S. and Interprovincial Waters	
ACTIV ELEM	N.W.R.I. and Regional Involvement in Canada-U.S. and Interprovincial Waters	

Goals

1. To determine concentration trends of radionuclides in open waters, fish, sediments, algae and zooplankton of Great Lakes and measure bioaccumulation factors of specific radionuclides.
2. To determine radiation dose to population using Great Lakes as a source of drinking water to measure compliance with GLWQA objective for radioactivity.
3. To measure age profiles of L. Ont. sediments using ^{210}Pb and ^{137}Cs to determine history of contamination of L. Ontario by chlorinated hydrocarbons.
4. As 1983 is designated as an intensive survey year for L. Superior, study will concentrate on open waters and fish samples from this lake.
5. Samples from 13 WQB stations from across Canada will also be analysed for radionuclides.

Performance Indicators

3. Publication by Oct. 83.
4. Report in July 83.

Justification

Fulfill DOE obligations to IJC GLWQA Surveillance Plan and detect any impact on the aquatic environment from nuclear power development.

STUDY TITLE	Radium-226 Pathways - Port Granby Waste Management Site to L. Ontario	DIV OR ORG ECD
KEY WORDS	RADIOACTIVITY, WASTE MANAGEMENT, GROUNDWATER, LAKE ONTARIO	SEC'N OR GRP RANUCS
STUDY LEADER	Durham, R.W.	TEL: 637-4289 PAE 4200
TEAM MEMBERS	A.G. Bobba, J. FitzGerald, S.R. Joshi	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. To determine the extent of ^{226}Ra , U and nitrate transport to Lake Ontario via ground water flowing under the lake from the Eldorado Nuclear Ltd., Waste Management site by analysis of water samples taken from piezometers installed along beach at foot of bluffs where radioactive waste is buried.
2. To calibrate NWRI contaminant transport model using data collected above and hydraulic and flow data measured in wells on beach.
3. Field season will start in April 83, in an attempt to measure early run-off values of concentration and flow. Interpretation of data will occur in fall after field program ends with publication following later.

Performance Indicators

1. Establishment of seasonal trend in data.
2. Model prediction agreeing with data.
3. Report by Dec. 83.

Justification

A major issue of ECS is the threat to human and wild life health from the disposal of toxic nuclear waste.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-242
1541

STUDY TITLE	Radionuclide Pathways in the Niagara River and Lake Ontario	DIV OR ORG ECD
KEY WORDS	SEDIMENTS, RADIOACTIVITY, NIAGARA RIVER, LAKE ONTARIO	SEC'N OR GRP RANUCS
STUDY LEADER	Joshi, S.R.	TEL: 637-4573 PAE 4200
TEAM MEMBERS	R.W. Durham, E.A. Kokotich, S. Livermore, J.A. FitzGerald	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Analyses of sediment samples, obtained during FY81-82, from 5 locations in Lake Ontario will continue. In addition to alpha-particle spectrometry for plutonium analyses, it is planned that these samples will also be analyzed by gamma-ray spectrometry for the presence of any gamma-emitters. It is anticipated that the analytical work will be completed by September 30, 1983.
2. The quantities of plutonium, and of any other radionuclides detected, entering lake Ontario by sediment transport will be derived using the available sedimentation rate data will be processed and assessed by December 31, 1983.

Performance Indicators

1. Report the analytical procedures developed during the study to a journal, by September 30, 1983, for publication.
2. Report the findings of the study, by March 31, 1984, in a journal publication.

Justification

The Canadian and U.S. federal governments, as well as those of Ontario and New York, have identified pollution of the Niagara River as a major cause for concern. Plutonium and, possibly, some other radionuclides, are expected to be found as a result of earlier nuclear fuel reprocessing effluents from West Valley, N.Y., entering the eastern end of Lake Erie.

STUDY TITLE	Aquatic Pathways of Radionuclides Released by Uranium Mining	DIV OR ORG ECD
KEY WORDS	RADIOACTIVITY, LAKES, SASKATCHEWAN	SEC'N OR GRP RANUCS
STUDY LEADER	Joshi, S.R.	TEL: 637-4573 PAE 4200
TEAM MEMBERS	R.W. Durham, J.A. FitzGerald, PDF	DATE 82/10/29
ECS PROGRAM	M.R.C. Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. Assess the research needs and select suitable sites for field work in northern Saskatchewan and collect various samples for radiochemical analysis by the end of Oct. 83.
2. Commence the analyses in November 1983 and continue during the remainder of the FY.

Performance Indicators

Report detailing the work done during the FY by March 31, 1984.

Justification

The study bears relevance to the TCMP High Profile Issues and Needs as well as the DOE priorities in the Energy Sector as outlined in the Departmental Strategic Plan. It is expected that the study will provide information on the presence of radiologically toxic elements in the aquatic environment as well as a knowledge of their actual and potential impact.

HYDRAULICS DIVISION

STUDIES FOR HYDRAULICS DIVISION

STUDY LEADER 83/06/15.

SECTION	STUDY	STUDY TITLE
DRAFTING	349	DRAFTING SERVICES TO CCW
ENVIRONMENTAL HYDRAULICS		
309	PERSISTENT TOXIC SUBSTANCES IN URBAN RUNOFF	MARSALEK, J.
311	TORONTO AREA WATERSHED MANAGEMENT STUDY (TAWMS)	MARSALEK, J.
313	COMPARISONS OF FLOW MODELS	KRISHNAPPAN, B. G.
314	ICE JAMS AND FLOODS	BELTAOS, S.
316	FRAZIL ICE	TSANG, G.
317	OIL SPILLS IN LAKES AND SEAS	TSANG, G.
321	SEDIMENT TRANSPORT UNDER ICE COVER	LAU, Y. L.
324	FRICITION FACTOR FOR MOBILE BOUNDARY CHANNEL FLOWS	ENGEL, P.
327	SEDIMENT LOAD MEASUREMENT	ENGEL, P.
328	UPDATING OF USERS MANUAL FOR MOBED	KRISHNAPPAN, B. G.
331	ICE PROBLEMS IN MILLBROOK AT KENVILLE, N.S.	BELTAOS, S.
332	DESIGN OF DIVERSIONS AND CONVEYANCE CHANNELS	LAU, Y. L.
323	WATERFORD RIVER BASIN - NEWFOUNDLAND	MARSALEK, J.
334	MODELLING OF SOLID AND LIQUID TRANSPORT IN STORM WATER SYSTEM	MARSALEK, J.
335	TRANSVERSE MIXING IN ICE-COVERED RIVERS	LAU, Y. L.
ENGINEERING SERVICES		
346	ENGINEERING SUPPORT TO NON-NWRI RESEARCH PROJECTS	TBA
358	ENGINEERING SUPPORT FOR SEDGW STUDIES	FORD, J. S.
373	PROGRAM FOR INDUSTRY LABORATORY PROJECT - INVOLVEMENT	FORD, J. S.
376	FLOOD FORECASTING ICE THICKNESS MEASURING	WATSON, A. S.
377	FRAZIL ICE RECORDER	FORD, J. S.
389	ENGINEERING SUPPORT TO NWRI RESEARCH	TBA
DIVISION		
318	EXTERNAL SERVICES AND CONSULTATION	DICK, T. M.
359	DIVISION MANAGEMENT	DICK, T. M.
MANUFACTURING AND TECHNICAL MAINTENANCE		
369	COMMON USER EQUIPMENT MAINTENANCE	TBA
372	INSTRUMENT CALIBRATION MAINTENANCE LABORATORY	MOLLON, K.
OFFICE SERVICES		
354	OFFICE SUPPORT SERVICES	HAWKINS, M.
356	OFFICE SERVICES - SLEDS	HAWKINS, M.
SHORE PROCESSES		
310	ENERGY-ARTIFICIAL ISLANDS	SKAFEL, M. G.
312	ECONOMIC DEVELOPMENT-MARINAS	SKAFEL, M. G.
337	COOPERATIVE STUDY WITH PUBLIC WORKS CANADA	SKAFEL, M. G.
338	AIR/WATER INTERACTION	DONELAN, M. A.
340	TURBULENT MIXING BENEATH WIND-GENERATED WAVES	DONELAN, M. A.
341	WIND-WAVE FLUME OPERATION	SKAFEL, M. G.
342	SHORELINE EVOLUTION, LAKE ERIE	COAKLEY, J. P.
345	SHORE RECEDITION	ZEMAN, A. J.
347	NEARSHORE BASELINE DATA	RUKAVINA, N. A.
352	NEARSHORE SEDIMENT DATA SERVICE	RUKAVINA, N. A.
353	ECONOMIC SHORE MANAGEMENT	SKAFEL, M. G.
TECHNICAL SERVICES		
361	LABORATORY METHODS FOR GEOTECHNICAL ANALYSIS-MANUAL (PART 2)	DUNCAN, G. A.
362	SEDIMENTOLOGY - GEOTECHNICAL SERVICES	DUNCAN, G. A.

STUDIES FOR HYDRAULICS DIVISION

SECTION	STUDY	STUDY TITLE
	303	TECHNICAL SUPPORT TO HYDRAULICS RESEARCH PROJECTS
	304	NATIONAL CALIBRATION SERVICE
	305	MAINTENANCE-HYDRAULICS LABORATORY
	306	EVALUATION OF THE 'PRICE' WATER CURRENT METER
	307	REPLACEMENT OF DATA ACQUISITION SYSTEM TOWING CARRIAGE
	308	AUTOMATED SIZE ANALYSIS

STUDY LEADER 83/06/15.
DEZEEUW, C.
DEZEEUW, C.
DEZEEUW, C.
DEZEEUW, C.
FEKET, D.
DUNCAN, G. A.

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA M			EXTERNAL			SHADOW			TOTAL RESOURCES			
	PY SAL	OM CAP	FY SAL	FY SAL	ON CAP	GAP	CM CAP	OUTN	PY SAL	AGCY PY SAL	OM CAP	CUST	PY SAL	AGCY PY SAL	OM CAP	CUST	PY SAL	OM CAP	PY SAL	OM CAP	TOTAL COST	
301	.20	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.24	5	--	--	5.0	
302	1.50	42	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	1.50	42	1.5	--	43.5	
303	11.90	307	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.90	307	--	--	307.0	
304	2.60	73	5.0	24.0	.14	5	.3	10.0	--	--	--	--	--	--	--	--	2.74	78	5.3	34.0	117.3	
305	1.20	34	37.0	1.0	--	--	--	--	--	--	--	--	--	--	--	--	1.20	34	37.0	1.0	72.0	
306	.20	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.20	5	--	--	5.0	
307	.20	5	4.0	4.0	--	--	--	--	--	--	--	--	--	--	--	--	.40	12	4.0	4.0	19.6	
308	.20	4	1.5	47.0	--	--	--	--	--	--	--	--	--	--	--	--	.20	4	1.5	47.0	52.5	
309	.15	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0	--	--	12.0	
310	.60	30	25.0	--	--	--	--	--	--	--	--	--	--	--	--	--	.60	30	25.0	--	55.0	
311	.10	5	.1	--	--	--	--	--	--	--	--	--	--	--	--	--	.10	5	.1	--	5.1	
312	.18	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.18	8	--	--	8.0	
313	.10	5	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	.10	5	1.0	--	6.0	
314	1.80	89	9.0	4.0	--	--	--	--	--	.40	12	4.0	--	1.0	--	SHADUM SHADOW TOPS	--	1.5	2.0	102	13.0	
315	.50	24	18.3	42.0	.11	4	3.0	2.5	.15	5	2.0	--	2.8	.20	7	--	--	1.5	.96	42	23.3	44.5
316	.50	24	18.3	42.0	.11	4	3.0	2.5	.15	5	2.0	--	2.8	.20	7	--	--	1.5	.96	42	23.3	44.5
317	.50	24	3.0	6.0	.18	6	2.5	--	--	--	--	--	--	--	--	--	--	.68	36	5.5	6.0	41.5
318	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	65.0	--	85.0	--
321	.60	28	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	.60	28	3.5	--	31.5	
324	.95	47	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	1.13	53	6.0	--	58.9	
327	.50	24	1.5	--	.25	8	14.0	--	--	--	--	--	--	--	--	--	.75	32	15.5	--	47.5	
328	.10	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.10	5	--	--	5.0	
331	.10	5	.4	--	--	--	--	--	--	--	--	--	--	--	--	--	.10	5	.4	--	5.4	
332	.30	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.30	15	--	--	15.0	
333	.65	32	2.4	--	--	--	--	--	--	--	--	--	--	--	--	--	.65	32	2.4	--	34.4	
334	1.25	61	7.0	3.0	--	--	--	--	--	--	--	--	--	--	--	--	.16	3	SHADUM SHADOW TOPS	--	60.1	
335	.40	20	3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0	1.35	64	7.8	3.0	
335	.40	20	3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24	3.5	--	25.4

DATE RUN 63/16/13.

PROCESSING FORMS FOR DIVISION HD

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA M			EXTERNAL			SHADOW			TOTAL RESOURCES--		
	PY SAL	OM CAP	FY SAL	PY SAL	OM CAP	FY SAL	CAP OVTM	PY SAL	AGCY PY SAL	OM CAP	CUST	PY SAL	OM CAP	CUST	PY SAL	OM CAP	CUST	PY SAL	OM CAP	TOTAL COST	
337 .01 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.01	1	--	--	--	1.0	
338 .50 24	8.3	--	--	--	--	--	--	--	.10	3	--	--	--	.60	27	8.3	--	--	35.6		
340 .70 35	7.4	--	.45	15	2.7	6.2	--	--	.14	5	--	--	--	1.29	54	16.1	6.2	--	70.6		
341 .01 1	2.8	--	--	--	--	--	--	--	.15	5	--	--	--	.16	6	2.8	--	--	8.03		
342 .80 39	2.2	--	--	--	--	--	--	--	.06	2	--	--	--	.86	41	2.2	--	--	43.02		
345 1.00 50	2.0	--	.03	1	.2	--	.40	13	1.5	--	1.0	.10	3	--	--	.5	.53	68	3.7	--	
345																				72.5	
346 1.50 43	3.5	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	1.50	43	3.5	4.0	50.05	
347 .90 45	14.5	--	.64	1	.64	--	.25	8	--	--	.12	4	--	--	--	1.31	58	14.9	--	72.7	
352 .10 5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.16	5	--	--	--	5.0	
353 1.20 59	2.8	--	.08	3	.05	--	.15	5	.05	--	.20	7	--	--	--	.5	1.63	73	3.8	--	
353																				77.2	
358 2.00 93	12.0	70.0	--	--	--	--	.10	3	1.4	--	--	--	--	--	--	2.10	96	13.4	70.0	179.4	
359 2.00 80	60.5	17.0	--	--	--	--	--	--	--	--	--	--	--	--	--	2.00	80	60.5	17.0	157.5	
364 3.80 80	76.0	3.0	--	--	--	--	--	--	--	--	--	--	--	--	3.80	80	76.0	3.0	159.0		
366 .20 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.20	4	--	--	--	4.0	
368 4.50 112	20.0	1.0	--	--	--	--	--	--	--	--	--	--	--	--	4.50	112	20.0	1.0	133.0		
369 2.00 58	19.0	16.0	--	--	--	--	--	--	--	--	--	--	--	--	2.00	58	19.0	15.0	92.0		
372 2.00 58	35.0	15.0	--	--	--	--	--	--	--	--	--	--	--	--	2.00	58	35.0	15.0	108.0		
373 .15 7	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	.15	7	1.0	--	--	8.03	
376 .35 17	5.0	40.0	--	--	--	--	.10	3	2.0	--	.8	--	SHADOW SHADOW TOPS	--	1.2	.45	21	7.0	40.0	69.0	
376																					
377 .50 24	9.0	9.0	--	--	--	--	.34	1	1.0	--	.2	--	SHADOW SHADOW TOPS	--	.3	.54	25	16.0	9.0	44.07	
377																					
389 --	--	--	--	--	--	--	--	--	.45	14	3.4	--	2.0	--	SHADOW SHADOW TOPS	--	5.0	.45	16	3.04	--
389																				23.09	
51.00 1739	496.0	305.0	1.020	.43	23.6	18.7	20.79	E3	16.3	--	6.0	1.55	51	--	5.0	--	56.91	1904	540.03	323.07	2765.0

STUDY TITLE	Laboratory Methods for Geotechnical Analysis - Manual (Part 2)	DIV OR ORG HD
KEY WORDS	ERODIBILITY, SEDIMENTS	SEC'N OR GRP TCSRVS
STUDY LEADER	Duncan, G.A.	TEL: 637-4230
TEAM MEMBERS	K. Salisbury, Consultant, A. Zeman	PAE 1713
ECS PROGRAM	Water Management Research	DATE 83/02/02
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To compile a manual on the laboratory procedure to test the erodibility of sediment, used in the Geotechnical Laboratory at CCIW by June

Performance Indicators

Completion of report by June/84.

Note: The erodibility analyser is undergoing a major modification at present. This study plan timetable is based on the completion of the instrument by March 1983.

Justification

The need exists to assemble, standardize and to document methods employed in the geotechnical lab for scientists and technicians using the lab equipment.

STUDY TITLE	Sedimentology - Geotechnical Services	DIV OR ORG HD
KEY WORDS	SEDIMENTS	SEC'N OR GRP TCSRVS
STUDY LEADER	Duncan, G.A.	TEL: 637-4230 PAE 1713
TEAM MEMBERS	K. Salisbury, Consultant, N. Rukavina	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To respond to requests for sedimentological and geotechnical sample analysis from groups outside the Hydraulics Division.

List of Clients:

Dept. of Public Works
 Ont. Ministry of the Environment
 University of Waterloo
 Environmental Contaminants Division/NWRI
 Dept. of Fisheries and Oceans
 Aquatic Ecology Division/NWRI
 Lands Directorate/CCIW
 Water Quality Branch/CCIW
 National Harbour Board
 GLFRB/CCIW
 Pacific Geoscience/EMR
 Queen's University

Performance Indicators

Turn around time for analysis and report by Technical Note one month per 80 samples from official receipt of samples.

Justification

Expertise and specialized equipment are needed to perform these sample analyses. Requests are received from Federal and Provincial agencies, universities and from the private sector. The Department's cost recovery policy will be applied.

STUDY TITLE	Technical Support to Hydraulics Research Projects	DIV OR ORG HD
KEY WORDS	SUPPORT, HYDRAULICS	SEC'N OR GRP TCSRVS
STUDY LEADER	C. Dezeeuw	TEL: 637-4733 PAE 1713
TEAM MEMBERS	Various, according to need	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To provide technical services to the research projects of the Hydraulics Laboratory

Performance Indicators

- Competent technical staff are hired when required.
- Staff are trained to become more efficient in their work and keep up with technological advances.
- Staff are assigned to meet requirements of engineers and scientists.
- Performance appraisals are used to enhance performance.

Justification

Scientific and engineering studies are being undertaken in the Hydraulics laboratory by scientists and engineers. Technical support is required in the stepping up of projects, the operation of unique equipment and the collection of data.

STUDY TITLE	National Calibration Service	DIV OR ORG HD
KEY WORDS	OPEN CHANNEL FLOW, STREAMS, NATURAL, STANDARDS, RIVERS, CALIBRATION, CURRENT METER	SEC'N OR GRP TCSRVS
STUDY LEADER	DeZeeuw, C.	TEL: 637-4733
TEAM MEMBERS	D. Fekyt, C. Bil, B. Near	PAE 1612
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

Goals

- Calibration and performance testing of current meters and other hydrometric devices and instruments used for data collection programs of ECS such as Water Survey of Canada.
- Calibration of water quantity survey velocity instruments for Canada's provinces, free of charge, as per Order in Council Article V-3
No's:
 1412-74 Newfoundland
 M7-74 Prince Edward Island
 75-325 Nova Scotia
 75-138 New Brunswick
 986 Quebec
 1030/75 Ontario (including Ontario Hydro)
 577/75 Manitoba
 282/75 Saskatchewan
 432/75 Alberta
 913 British Columbia
 Letter of Exchange (May 23, 1975) Yukon and NWT
- Calibration of current meters for universities, consulting engineering firms, Hydro companies and other private agencies applying the Department's cost recovery policy.

Justification

The towing tank and associated equipment and the environmental chambers are unique and the only facility in Canada specialized to perform tests and calibrate water current meters. Streamflow measurements are taken for the survey of our national water resources, flow and flood forecasting, the design of dams and bridges, power generating investigations, industrial investigations and for studies in limnology and marine science.

STUDY TITLE	Maintenance-Hydraulics Laboratory	DIV OR ORG HD
KEY WORDS	OPERATE BUILDINGS, MAINTENANCE	SEC'N OR GRP TCSRVS
STUDY LEADER	DeZeeuw, C.	TEL: 637-4733 PAE 1713
TEAM MEMBERS	G. Voros, D. Fekyt, T. Nudds, E. Nash	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To maintain in good working order all major research equipment located in the Hydraulics Laboratory such as a windwave flume fan system, and wave-board, six major pumps supplying water to research projects, six flumes, compressors of environmental chambers, sediment handling system, movable wave maker and several computers.
- To maintain in good working order all measuring instruments and devices, mechanical-electrical and electronic, used to obtain data and other information during experiments. This also involves writing off obsolete equipment and the purchase of new equipment.
- To provide adequate storage for delicate equipment and keep a sufficient amount of spare parts and general supplies on hand.

Performance Indicators

- That no major breakdowns occur which could be predicted.
- No delay in data collection occurs that could be avoided.
- That delicate equipment is not unnecessarily damaged while in storage and no delays occur due to shortage of supplies.

Justification

- The Laboratory's major equipment is highly specialized and unique and is operated and maintained by trained and specialized people to ensure that research is conducted in a most efficient way avoiding expensive shutdown time and repair cost.
- Due to high humidity levels in the laboratory, mechanical and electronic equipment requires more than average maintenance, there is also a need to replace obsolete equipment as technology is progressing rapidly.
- A supply of spare parts and general supplies contributes to efficient operation of the laboratory.

STUDY TITLE	Evaluation of the 'Price' Water Current Meter	DIV OR ORG HD
KEY WORDS	CURRENT METER, EVALUATION	SEC'N OR GRP TCSRVS
STUDY LEADER	DeZeeuw, C.	TEL: 637-4733 PAE 1612
TEAM MEMBERS	P. Engel, C. Bil, B. Near	DATE 83/02/02
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

Goals

To continue evaluation tests on the 'Price' 622AA current meter with a report on 'The Effect of Current Meter Position Above Suspension Weight'.

Performance Indicators

Completion of report by March 1984.

Reports Already Completed

A Universal Calibration Equation for Price Meters and Similar Instruments. P. Engel, 1976.

Determination of Waiting Times Between Successive Runs When Calibrating Price 622AA Current Meter. P. Engel, C. DeZeeuw, 1977.

Effect of Horizontal Alignment on the Performance of Price 622AA Current Meter. P. Engel, C. Dezeeuw, 1977.

Effect of Vertical Alignment on the Performance of Price 622AA Current Meter. P. Engel, C. DeZeeuw, 1979.

Sensitivity of Price 622AA Current Meter to the Effects of Frazil Ice. P. Engel, C. Dezeeuw, 1981.

Reports Under Present Investigation

Effects of Reduction of Calibration runs for the Price 622AA Current Meter Without Impeding the Calibration Accuracy.

Justification

Request received from Water Survey of Canada

STUDY TITLE	Replacement of Data Acquisition System Towing Carriage	DIV OR ORG HD
KEY WORDS	INSTRUMENTATION, CURRENT METER, DATA COLLECTION	SEC'N OR GRP TCSRVS
STUDY LEADER	Fekyt, D.	TEL: 637-4520 PAE 1612
TEAM MEMBERS	P. Engel, G. Beal, C. DeZeeuw	DATE 83/02/02
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

GoalsPerformance Indicators

- To test and evaluate the newly acquired data acquisition system to better understand its capabilities and limitations.
- To write a number of computer programs to enable the system to collect and process the necessary data.
- To obtain the necessary spare parts to ensure that parts are available to operate the system during the next ten years.

By March 1984 the system will be able to:

- Collect data showing accuracy of each run.
- Plot data and derive the equation.
- Print calibration certificates, tables and routine correspondence.
- Inventory information all current meters calibrated at NCS.

Justification

The original system is obsolete and not repairable. The new data acquisition system will also greatly increase the accuracy of data collection and data processing and will reduce processing time.

STUDY TITLE	Automated Size Analysis	DIV OR ORG HD
KEY WORDS	SIZE ANALYSES, COMPUTER	SEC'N OR GRP TCSRVS
STUDY LEADER	Duncan, G.A.	TEL: 637-4230 PAE 1713
TEAM MEMBERS	K. Salisbury, Consultant, N. Rukavina	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To improve efficiency of size analysis procedures by integrating the sedigraph fine particle analyzer the settling tube (coarse analysis) analyser with a computer system.

Performance Indicators

Completion of report by end of July 1983.

Justification

Accurate and reliable analysis with fast turn around time demands an updating of our system.

STUDY TITLE	Persistent Toxic Substances in Urban Runoff	DIV OR ORG HD
KEY WORDS	TOXIC SUBSTANCES, PATHWAYS, POLLUTION, URBAN, RUNOFF, DATA COLLECTION, PCB's, PESTICIDES, GREAT LAKES	SEC'N OR GRP EHS
STUDY LEADER	Marsalek, J.	TEL: 637-4328 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

Complete the report on loadings of persistent toxic substances in urban runoff draining to Lower Great Lakes, by September 30, 1983.

Performance Indicators

- Catalogue analytical results.
- Prepare the final report.

Justification

This is the final stage of the study which was initiated in support of the Great Lakes Water Quality Agreement 1978. Hydraulics Division involvement has been requested by DG, Ontario.

Urban areas contribute to toxic loadings in lakes and rivers through runoff.

STUDY TITLE	Energy-Artificial Islands	DIV OR ORG HD
KEY WORDS	ENERGY PRODUCTION, ISLANDS-ARTIFICIAL, IMPACT	SEC'N OR GRP SHORES
STUDY LEADER	Skafel, M.G.	TEL: 637-4736 PAE 1713
TEAM MEMBERS	C. Bishop	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To design guidelines to minimize environmental hazards due to overtapping or vertically sided caisson retained artificial islands.
- To improve design procedures used for the protection of vertical caissons and for filter layers.

Performance Indicators

- Undertake laboratory investigation and prepare interim analysis and report by 1984.
- Complete tests and analysis with final recommendations and design manual with recommendations by March 1985.

Justification

Supported by Panel on Energy R&D. The engineering performance of artificial islands under wave attack is not known. Failure would result in high costs and environmental damage.

STUDY TITLE	Toronto Area Watershed Management Study (TAWMS)	DIV OR ORG HD
KEY WORDS	URBAN, RIVERS, RUNOFF, WATER QUALITY, SYSTEMS MODELLING, TRENDS, WATER MANAGEMENT	SEC'N OR GRP EHS
STUDY LEADER	Marsalek, J.	TEL: 637-4328
TEAM MEMBERS	Technical Committee for TAWMS	PAE 1713
ECS PROGRAM	Water Management Research	DATE 83/02/02
ACTIV ELEM	Hydraulics (NWRI)	

Goals

Develop a Water Management Plan that will maintain or upgrade water quality in the upper stream reaches and upgrade water quality in urbanizing and urbanized areas, by 1986.

Performance Indicators

- Problem definition and watershed prioritization.
- Initiate detailed analysis of urban runoff problems.

Justification

HD involvement was requested by the Ministry of the Environment. Nearshore areas of Lake Ontario in the Toronto area are severely impacted by human activities in tributary watersheds. The water courses draining these watersheds have impaired water quality as a result of urban runoff, agricultural drainage, combined sewer outflows, and effluent discharges. A water management plan is needed to remedy this situation.

STUDY TITLE	Economic Development - Marinas	DIV OR ORG HD
KEY WORDS	SMALL CRAFT	SEC'N OR GRP SHORES
STUDY LEADER	Skafel, M.G.	TEL: 637-4736 PAE 1713
TEAM MEMBERS	C. Bishop	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To provide advice and planning criteria for the implementation of small craft harbours which will meet performance criteria for wave agitation, navigability and economy.

Performance Indicators

Timely response to problems and development identified by Small Craft Harbours Branch of the Dept. of Fisheries and Oceans.

Justification

Wave action in harbours is extremely complex and must be evaluated by experts in wave motion with the help of specialized physical or mathematical models and with complex laboratory equipment. Environmental criteria and effects must also be evaluated to ensure compatibility with control regime and to avoid excessive costs or claims against Government for damage.

STUDY TITLE	Comparisons of Flow Models	DIV OR ORG HD
KEY WORDS	MODELS, RIVER MODELLING, SEDIMENTS, FLOW	SEC'N OR GRP EHS
STUDY LEADER	Krishnappan, B. G.	TEL: 637-4622 PAE 1713
TEAM MEMBERS		DATE 83/02/17
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

Predict the changes in the streambed in the South Saskatchewan River below Gardiner Dam using both MOBED and HEC-6 and compare the predictions against data.

Performance Indicators

- Acquisition and installation of the HEC-6 model.
- Operation of HEC-6 and MOBED using South Saskatchewan River data.
- Model result comparison.
- Report by March '84.

Justification

This study is proposed at the direct request of IWD as identified by the IWD research needs. The sediment survey section of IWD wishes to use sediment flow models as an aid to the planning of field programs. Because HEC-6 is often applied to unsteady flow problems without justification, a comparative study is required against a truly unsteady flow model.

STUDY TITLE	Ice Jams and Floods		DIV OR ORG HD
KEY WORDS	DATA-HISTORICAL, RIVERS, ICE JAMS , BREAKUP		SEC'N OR GRP EHS
STUDY LEADER	Beltaos, S.	TEL: 637-4329	PAE 1713
TEAM MEMBERS	J. Wong		DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Hydraulics (NWRI)		

Goals

To understand the mechanisms of ice jamming and develop theories, mathematical models or methods to improve the management of ice covered rivers and to reduce flooding.

Performance Indicators

- Analyse historical water stage records at breakup to obtain, if possible, a criteria for forecasting time and flooding potential. An interim report is due March '84.
- To study the mechanisms of ice jams and their effects in order to quantify by theory or model the phenomenon. A progress report is due March '84.
- To continue a study of ice jam release and subsequent flood wave with a view to describing and quantifying the phenomena when the surge is arrested. A report on laboratory tests required as a preliminary paper is due March '84.

Justification

Ice jams constitute a flooding threat which is presently not quantifiable. In addition, the inter basin transfer of water, and the installation of hydro power all require an assessment of the change in the ice regime. New structures across or under rivers require an assessment of sediment transport and ice forms.

STUDY TITLE	Frazil Ice	DIV OR ORG HD
KEY WORDS	FRAZIL ICE, SALINE WATER, TURBULENCE	SEC'N OR GRP EHS
STUDY LEADER	Tsang, G.	TEL: 637-4735 PAE 1713
TEAM MEMBERS	Prof. T. O'D Hanley, University of Regina	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To analyse and develop theories or models of frazil ice behaviour in rivers and seas in order to avoid problems in energy developments

Performance Indicators

- a) Establish the effect of salinity and turbulence on frazil ice production and its effect if any on its adherence to structures. Report or paper by September '84.
- b) Complete the calibration of a prototype frazil ice instrument and document performance by September '83.
- c) Measure the distribution of frazil ice in a river so that the assessments of rate of production of ice in open water is related to theoretical estimates from flow and meteorological observations. Report on progress by September '84.
- d) Analyse available data on hanging dams and evaluate loss of power available for energy production. Report by December '84.

Justification

Energy production alters flows in rivers in winter, navigation developments cause open leads; offshore structures in salt water may be affected severely by frazil ice produced in winter.

Studies are required to establish its formation, properties and behaviour in rivers and lakes. Information on frazil is essential to establish the impact of energy developments, flooding conveyancy capabilities and ice jams.

STUDY TITLE	Oil Spills in Lakes and Seas	DIV OR ORG HD
KEY WORDS	GAS PLUME, MODELS, UNDERWATER	SEC'N OR GRP EHS
STUDY LEADER	Tsang, G.	TEL: 637-4735 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To complete, by the end of the fiscal year the investigation on the model testing criteria of strong bubble plumes.

Performance Indicators

- Preparation of experiment
- Experiment
- Analysis of data
- Writing of scientific paper

Justification

There is the need to study the gas plume from gas and oil well blowouts under water. Because of the disastrous nature and infrequency of these events, their study is best done by modelling study. In the past, no specific provision was made for guiding such experiments. However, theoretical work done in the past year showed that the experiments should have been performed under vacuum. Thus, past work may prove to be incorrect. This study will systematically study the variables involved and their effect on the model testing if the simulation laws are violated.

Data and theory is required to design and organize control and clean up measures.

STUDY TITLE	External Services and Consultation	DIV OR ORG HD
KEY WORDS	COST RECOVERY	SEC'N OR GRP HDDIV
STUDY LEADER	Dick, T.M.	TEL: 637-4738 PAE 1716
TEAM MEMBERS	Y.L. Lau, M.G. Skafel, C. Dezeeuw, J. Ford	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To provide specialized services or tests, using when necessary unique laboratory equipment and recovering costs through the Cost Recovery Policy.

Performance Indicators

- Timely response to clients.

Justification

The laboratory equipment was designed to provide a national resource. The unique equipment, not available commercially may be leased or operated for clients in the private or public sectors based on the cost recovery policy.

The project assists economically the private and public sector in their R&D needs.

STUDY TITLE	Sediment Transport Under Ice Cover	DIV OR ORG HD
KEY WORDS	SEDIMENTS, TURBULENCE, ICE COVER	SEC'N OR GRP EHS
STUDY LEADER	Lau, Y.L.	TEL: 637-4327
TEAM MEMBERS	B.G. Krishnappan	PAE 1713
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- Complete flume experiments to obtain data on bed form characteristics, sediment transport and turbulence characteristics in flows with top cover by May 1983.
- Obtain comparison of sediment transport characteristics in ice-covered flows with those in free-surface flows.
Produce report by August 1983.

Performance Indicators

Report

Justification

Knowledge of sediment transport is important for many water resource management decisions. Sediment transport characteristics change when a river becomes ice covered. It is not known if the dimensionless relationships which have been established for free surface flows can be applied to ice-covered flows.

Essential for assessment of river flow change in north or elsewhere, such as caused by diversions or power development.

STUDY TITLE	Mobile Boundary Channel Flows	DIV OR ORG HD
KEY WORDS	FRICITION FACTOR, BED FORMS, UNIFORM FLOW, FLOOD PLAINS, ICE COVERS	SEC'N OR GRP EHS
STUDY LEADER	Krishnappan, B.	TEL: 637-4622 PAE 1713
TEAM MEMBERS	S. Beltaos, L. Lau, P. Engel	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To measure & analyze the resistance to flow in mobile bed channels and flood plains and develop models and theories to greatly improve predicted flood levels and discharges.

Performance Indicators

- a) Measure friction factor in mobile boundary flows and test Yalin's hypothesis for skin friction roughness relative to the whole.
Report to be ready March '84
- b) Measure the response time of mobile bed flows in the laboratory in order to improve real time modelling of flood flows.
Report to be ready March '84
- c) Measure resistance to flow caused by meanders and incorporate it in models of river flow with mobile beds.
Report to be ready March '84
- d) Measure the change in flow resistance in floods when an ice cover is moving and analyse using the 3-D turbulence model.
Report to be ready March '84
- e) Modify 3-D turbulence model to give accurate results for computing flow in channels and flood plain and report by March '84.

Justification

Flood level prediction depends on knowing the bed roughness and flood plain roughness. Rivers with mobile beds react to flows changing the roughness. Accurate delineation of flood plains, especially where river flows are changed by diversion is required for planning.

STUDY TITLE	Sediment Load Measurement	DIV OR ORG HD
KEY WORDS	EFFICIENCY, GRAIN SIZE, SEDIMENT TRANSPORT	SEC'N OR GRP EHS
STUDY LEADER	Engel, P.	TEL: 637-4737 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To improve measurement techniques of sediment transport in order to reduce costs, improve accuracy and improve efficiency of surveys.

Performance Indicators

- a) Compare different techniques of estimating dune velocity in order to improve the use of the Hydrographic method of sediment load measurement in large rivers. Report by March '84
- b) Obtain operating and calibration criteria to improve bed load estimates by the VUV sampler. Report by April '83.

Justification

Requests to improve operation and measurement are made by WSC.

Sediment load estimates are important for reservoir life capacity, operation of intakes, river bed aggradation and flooding.

STUDY TITLE	Updating of Users Manual for MOBED	DIV OR ORG HD
KEY WORDS	SUPPLEMENT, MODEL MOBED, IMPROVEMENTS, USER MANUAL	SEC'N OR GRP EHS
STUDY LEADER	Krishnappan, B.G.	TEL: 637-4622 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To prepare a supplement to the Users Manual for MOBED incorporating suggestions for improvement received from various users of the model.

Performance Indicators

- Implementation of changes in the program.
- Debug the program.
- Prepare the supplement to the Users Manual.

Justification

Since the publication of the Users Manual for MOBED in February 1981, the model has been successfully applied to several field applications by various users and the feedback from these users points toward possible improvements, especially in the area of data input to model. A supplement containing these improvements will further enhance the utility of MOBED.

MOBED is a new model of great power.

STUDY TITLE	Ice Problems in Millbrook at Kentville, N.S.		DIV OR ORG HD
KEY WORDS	FLOODING, ICE JAMS		SEC'N OR GRP EHS
STUDY LEADER	Beltaos, S.	TEL: 637-4329	PAE 1713
TEAM MEMBERS			DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Hydraulics (NWRI)		

Goals

Provide advice as requested in 1983/84
(to IWD) regarding:

Consultant's study of ice problems and
possible alleviation methods in Millbrook
at Kentville, N.S.

Performance Indicators

- Provide advice from time to time as requested.

Justification

Requested by IWD - Atlantic Region

STUDY TITLE	Design of Diversions and Conveyance Channels		DIV OR ORG HD
KEY WORDS	DIVERSIONS, CHANNELS		SEC'N OR GRP EHS
STUDY LEADER	Lau, Y.L.	TEL: 637-4327	PAE 1713
TEAM MEMBERS	B.G. Krishnappan, P. Engel		DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Hydraulics (NWRI)		

Goals

Obtain preliminary information on problems associated with river diversions and year-round water conveyance channels.
Identify possible research needs.

Performance Indicators

Literature review.

Justification

Interbasin water transfer will become a necessity for many locations to meet the demands for power production, irrigation and domestic use. There may be many problems associated with such transfers which we do not realize. Investigations into possible effects will help with the design and management of such projects.

STUDY TITLE	Waterford River Basin - Newfoundland	DIV OR ORG HD
KEY WORDS	URBAN, RIVERS, RUNOFF, WATER QUALITY, SYSTEMS MODELLING, TRENDS, MANAGEMENT	SEC'N OR GRP EHS
STUDY LEADER	Marsalek, J.	TEL: 637-4328 PAE 1713
TEAM MEMBERS	Technical Committee for the Waterford River Study (NWRI - H. Ng, Res. Technician)	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- Evaluate the impacts of urbanization on water quality and quantity in the basin by 1986.
- Analyze field data from the urban test catchment by March 31, 1984.
- Produce an interim evaluation of modelling results for the urban test catchment, by March 31, 1984.
- Participate in the study management.

Performance Indicators

- Reduce field data.
- Produce an interim model evaluation report.

Justification

Urbanization of the Waterford Basin is causing serious water quality and quantity problems. The effects of urbanization need to be investigated, in order to develop guidelines for effective control and management of urban development.

The study is jointly sponsored by DOE and the Province of Newfoundland. Hydraulics Division involvement has been requested by SDG, IWD.

STUDY TITLE	Modelling of Solid and Liquid Transport in Storm Water System	DIV OR ORG HD
KEY WORDS	URBAN, RUNOFF, WATER QUALITY, SYSTEMS MODELLING, MANAGEMENT	SEC'N OR GRP EHS
STUDY LEADER	Marsalek, J.	TEL: 637-4328
TEAM MEMBERS	B.G. Krishnappan, H. Ng, Res. Technician	PAE 1713
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To improve the theories and modelling of liquid and sediment phases in urban drainage systems.

Performance Indicators

- Evaluate the applicability of MOBED to compute accurately the movement and storage of solids in stormwater systems and impoundments.
Report by March '84
- Develop a methodology to establish runoff peak frequency curves for urban catchments by March '84.
- Obtain design data for hydraulic losses at pipe junctions in order to improve model performance. Report progress by March '84.

Justification

Inaccurate synthesis of urban runoff peak frequencies leads to either flooding or over costly structures. Conservation of resources requires better methods. The Engineering Foundation Research Conference on storm water impoundments identified the need to improve design of retention ponds.

Protection of water courses from polluted sediments is a feature of retention ponds and it is essential design conditions are met. Sewer junctions are bottlenecks in systems and must be correctly separated in models. Follow up studies are required for work started under COA which are relevant to the IWD priority on redevelopment runoff models.

STUDY TITLE	Transverse Mixing in Ice-Covered Rivers	DIV OR ORG HD
KEY WORDS	MIXING, ICE COVER	SEC'N OR GRP EHS
STUDY LEADER	Lau, Y.L.	TEL: 637-4327 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- Obtain data from field experiments on the mixing of tracers in ice-covered rivers in January '84.
- Produce a report on the mixing coefficient for ice-covered flows by June '84.

Performance Indicators

Complete field tests on 4 or 5 sites.

Justification

The rate at which pollutants spread under ice-covered rivers is important information for environmental assessment review process, the planning of discharges and the modelling of ice-covered flow phenomena. Data on mixing under ice are very scarce. The only two published studies do not agree with each other. This study should produce information which will resolve the difference.

The work is highly significant for assessment of outflow dispersal in the north.

STUDY TITLE	Cooperative Study with Public Works Canada	DIV OR ORG HD
KEY WORDS	HARBOURS, WAVES, MODELS	SEC'N OR GRP SHORES
STUDY LEADER	Skafel, M.G.	TEL: 637-4736 PAE 1713
TEAM MEMBERS	C. Bishop	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To assist in the planning of major coastal structures so that they meet performance and environmental criteria. Each case will have specific goals.

Performance Indicators

This cooperative study will be composed of a series of projects. Each problem will be studied on its own merits. (Incremental costs will be recovered from DPW or Small Craft Harbours if they are the "client" of DPW.)

Justification

Investment in coastal structures such as harbours and breakwaters are costly. Selection of the optimum plan to meeting fiscal, environmental, and engineering criteria requires the use of sophisticated model technology and the analysis of available field data.

(Agreement with DPW by Director's letter of January 24, 1970: 1371-6)

STUDY TITLE	Air/Water Interaction	DIV OR ORG HD
KEY WORDS	WAVES, WIND, TURBULENCE	SEC'N OR GRP SHORES
STUDY LEADER	Donelan, M.A.	TEL: 637-4231 PAE 1713
TEAM MEMBERS	D. Beesley, T. Nudds	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To provide a theory or model which will estimate closely the water roughness, wave statistics and fluxes of mass and heat by March '87.

Performance Indicators

To analyze data, perform laboratory experiments and report on both by March 1984.

Justification

Flooding, water quantities, circulation of water in a lake, wave heights and frequencies and heat budgets, require more advanced and more accurate models of surface conditions and interaction with the wind.

Economic development demands that dykes and dams be constructed efficiently.

STUDY TITLE	Turbulent Mixing Beneath Wind-Generated Waves	DIV OR ORG HD
KEY WORDS	MIXING, TURBULENCE, WAVES	SEC'N OR GRP SHORES
STUDY LEADER	Donelan, M.A.	TEL: 637-4231 PAE 1713
TEAM MEMBERS	M. Skafel, S.A. Kitaigorodskii, D. Beesley	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To establish a theory or model which will predict the development of the epilimnion in a lake or reservoir by March 1986.

Performance Indicators

To complete and report on laboratory experiments on the turbulence and currents beneath a wind stressed water surface by March 1986.

Justification

The management of water quality in lakes and reservoirs requires a knowledge of vertical transport processes and a way to predict the epilimnion thickness from meteorological data in absence of long term records. Resuspension of muds occurs because of vertical and horizontal turbulence and currents under waves. Theories and application to new sites depends on understanding the process.

STUDY TITLE	Wind-Wave Flume Operation	DIV OR ORG HD
KEY WORDS	WAVES, WIND, FLUME	SEC'N OR GRP SHORES
STUDY LEADER	Skafel, M.G.	TEL: 637-4736 PAE 1713
TEAM MEMBERS	T. Nudds	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To maintain and upgrade the component systems of the wind-wave flume.

Performance Indicators

- Implement software upgrades and write special purpose software, as required.
- Order and install replacement parts as required.

Justification

The various systems in the wind-wave flume need periodic upgrading and maintenance that cannot be charged to individual studies. Efficient and effective operation depends on development and proper maintenance of equipment and instruments.

STUDY TITLE	Shoreline Evolution, Lake Erie	DIV OR ORG HD
KEY WORDS	SHORELINE, LAKE ERIE	SEC'N OR GRP SHORES
STUDY LEADER	Coakley, J.P.	TEL: 637-4248 PAE 1713
TEAM MEMBERS	A.J. Zeman	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To assemble data and interpret geological history so that modern sedimentological processes are in correct perspective for Lake Erie

Performance Indicators

Prepare baseline data report on available borehole in March 1984.

Complete report on the evolution of central Lake Erie shoreline by March 1984.

Justification

Studies undertaken for EARP, Small Craft Harbours and others require a geological framework for correct interpretation. Management of federal park land and other property requires development of long term policies which correctly assess long term trends.

STUDY TITLE	Shore Recession	DIV OR ORG HD
KEY WORDS	COHESIVE SEDIMENTS, SUBAQUEOUS EROSION, SEDIMENTS GEOTECHNICAL PROPERTIES	SEC'N OR GRP SHORES
STUDY LEADER	Zeman, A.J.	TEL: 637-4248
TEAM MEMBERS	HD Technician, TOD, D.G. Krishnappan (consultant)	PAE 1713 DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To establish the variables controlling the recession of cohesive shores and the associated structural stability by March 1986.

Performance Indicators

- Evaluate and report on the feasibility of using Caouette Flow to give erodibility index by March 1984.
- Publish concluding reports on the internal stresses and overall stability of bluffs including groundwater effects with reference to a specific site by March 1984.

Justification

Recession of many Canadian shores in lakes and reservoirs are composed of cohesive soils. Special attention must be paid to this problem as information for management and control is lacking. Small Craft Harbours, applications made in NWPA, conservation authorities and EARP all require improved methods of design or assessment. Heritage lands, national parks all require evaluation involving cohesive soils. The subject requires special attention.

STUDY TITLE	Engineering Support to Non-NWRI Research Projects	DIV OR ORG HD
KEY WORDS	NWRI, SUPPORT	SEC'N OR GRP ENSRVS
STUDY LEADER	TBA	TEL: 637-4 PAE 1716
TEAM MEMBERS	Various, according to need	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

To provide engineering services to other than NWRI, as requested.

Performance Indicators

Engineering Services Section was created to provide service to the research program of NWRI and to others as resources were available.

Justification

To provide all classes of engineering skills to solve problems in other than NWRI. This does not include drafting services.

STUDY TITLE	Nearshore Baseline Data	DIV OR ORG HD
KEY WORDS	NEARSHORE, GREAT LAKES, SEDIMENTS,	SEC'N OR GRP SHORES
STUDY LEADER	Rukavina, N.A.	TEL: 637-4247 PAE 1713
TEAM MEMBERS	J. Dalton, B. Haras (BLMSS)	DATE Revis. 5/5/83
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To survey, interpret and record in accessible form the distribution of sediments and strata in the near-shore zone of the Great Lakes in order to provide baseline data for environmental and resources development studies.

Performance Indicators

- Complete data organization in electronic and atlas form for Lakes Ontario and Erie by March 1984.

Justification

Baseline data in nearshores of the Great Lakes are not available. Such data are essential for resource development assessments, engineering developments and environmental impact assessments. Economic development of nearshore granular deposits require an understanding of the system.

STUDY TITLE	Nearshore Sediment Data Service		DIV OR ORG HD
KEY WORDS	NEARSHORE, GREAT LAKES, SEDIMENTS, TECHNOLOGY TRANSFER		SEC'N OR GRP SHORES
STUDY LEADER	Rukavina, N.A.	TEL: 637-4247	PAE 1713
TEAM MEMBERS	J. Dalton		DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Hydraulics (NWRI)		

Goals

To prepare reports on nearshore sediment data in response to internal and external requests.

Performance Indicators

Timely response to requests by client.

Justification

Technology transfer and information in support of coastal research, planning and engineering studies.

STUDY TITLE	Economic Shore Management	DIV OR ORG HD
KEY WORDS	TECHNOLOGY TRANSFER, MARINAS, WAVES	SEC'N OR GRP SHORES
STUDY LEADER	Skafel, M.G.	TEL: 637-4736 PAE 1713
TEAM MEMBERS	J. Valdmanis, H. Savile, C.T. Bishop	DATE 83/05/05
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To devise strategies, theories or models of shore evolution.
- To devise methods for efficient management of shores by 1990.

Performance Indicators

- Complete manual on marina breakwaters and publish.
- Develop and propose strategy for management based on processes.
- Evaluate existing shore evolution and littoral transport models.

All by March 1984.

Justification

Economic developments of the shore zone must consider the environmental impacts and the alteration of natural processes to avoid high financial costs.

Small Craft Harbours, F&O, applications under the Navigable Waters Protection Act and the Environmental Assessment and Review Process all require methods to obtain quantitative assessments not now available.

Heritage lands, national parks and other valuable lands often require protection or investigation of recession caused by developments or environmental change.

STUDY TITLE	Engineering Support for SEDWG Studies		DIV OR ORG HD
KEY WORDS	NWRI SUPPORT		SEC'N OR GRP ENSRVS
STUDY LEADER	J.S. Ford	TEL: 637-4310	PAE 1716
TEAM MEMBERS	Various according to need.		DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)		

Goals

To complete the seven studies approved by the SEDWG Committee, within the allocated resources. The individual goals for each study are stated on each of these study plans.

Performance Indicators

- All studies and reports will be completed by 31 March 84.
- Specific progress requirements will be as listed on the study plans.

Justification

The studies selected by the SEDWG Committee are those which are, in its opinion, the most relevant in terms of meeting the national goals.

STUDY TITLE	Division Management	DIV OR ORG HD
KEY WORDS	MANAGEMENT, ADMINISTRATION	SEC'N OR GRP HDDIV
STUDY LEADER	Dick, T.M.	TEL: 637-4738 PAE 1713
TEAM MEMBERS	A. Mueller, C. Leacock	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To provide planning, direction, coordination and control of scientific and service projects.

Performance Indicators

- Maintenance of scientific quality.
- Efficient expenditure of funds.

Justification

The planning of programs and implementation of regulations for control of resources requires management expertise.

STUDY TITLE	Division Capital Acquisition	DIV OR ORG HD
KEY WORDS	CAPITAL	SEC'N OR GRP HDDIV
STUDY LEADER	Dick, T.M.	TEL: 637-4738 PAE 1716
TEAM MEMBERS	Y.L. Lau, M.G. Skafel, C. Dezeeuw, M. Hawkins A. Pashley, C. Leacock	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To systematically replace obsolete equipment in order to maintain efficiency and effectiveness of the research and service programs.
- To acquire new equipment for efficient measurements and data acquisition for research studies.

Performance Indicators

- Obsolete equipment replaced in a fashion with no disruption to research and service programs.
- New equipment acquired in a timely fashion.

Justification

The National Research Institute and the Hydraulics Division must maintain the capability for state-of-the-art research.

STUDY TITLE	Office Support Services	DIV OR ORG HD
KEY WORDS	ADMINISTRATION, DATA COLLECTION	SEC'N OR GRP OFSRVS
STUDY LEADER	Hawkins, M.	TEL: 637-4267 PAE 1713
TEAM MEMBERS	D. Jacobs, E. Jones, N. Snelling	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

- To provide efficient and orderly production and distribution of reports and publications, complete and accurate records and to collect relevant statistics.
- To provide clerical and financial support to the Divisional operations.
- To provide support to the other sections of HD
- To manage office space and services and provide word processing services to staff.

Performance Indicators

- Statistics on requests for reports.
- Revision of HD operation guidelines.
- Status report on reports in production.
- Master distribution mailing lists.

Justification

Communication of scientific research.
 Efficient operation of Divisional office.

STUDY TITLE	Office Services - SLEDS	DIV OR ORG HD
KEY WORDS	DATA COLLECTION	SEC'N OR GRP OFSRVS
STUDY LEADER	Hawkins, M.	TEL: 637-4267 PAE 1713
TEAM MEMBERS		DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Hydraulics (NWRI)	

Goals

To maintain files of shore erosion data and other information transferred from the Dept. of Fisheries and Oceans and to provide an information service to public and other government departments.

Performance Indicators

Files maintained in neat and accessible condition with accurate log kept of requests.

SLEDS = Shoreline Levels Erosion Damage Studies

Justification

Files and data on the Great Lakes shore were transferred to Hydraulics when program closed down in Fisheries and Oceans.

STUDY TITLE	Drafting Services to CCIW	DIV OR ORG HD
KEY WORDS	DRAFTING, ILLUSTRATING, PHOTOGRAPHY, VISUAL AIDS, REPROGRAPHICS	SEC'N OR GRP DRFTG
STUDY LEADER	Finn, W.D.	TEL: 637-4278 PAE 1716
TEAM MEMBERS	M. Donnelly, P. McColl, J. VanNynatten, J. Field, Contract	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

- To provide drafting and illustrating services which include, cartographic, scientific and technical illustration and graphic art as required for publication purposes and media activities.
- To provide occasional mechanical drafting service on shop and detail drawings.
- To provide electronic diagrams and schematic drawings for publication of manuals and reports.
- To provide photography and reprographic service.

Performance Indicators

- Drafting Service will complete approximately 450 work orders, entailing approx. 1750 drawings of professional high quality suitable for scientific or engineering publication and provide professional photographic and reprographic service as required.

Justification

The scientific and engineering staff at the Canada Centre for Inland Waters produce many publications, reports, papers and visual presentations which required drafting illustrating and photography and reprographic support provided by the Drafting Services Section.

STUDY TITLE	Common User Equipment Maintenance	DIV OR ORG HD
KEY WORDS	MAINTENANCE, EQUIPMENT	SEC'N OR GRP MANTEC
STUDY LEADER	To be announced	TEL: 637-4 PAE 1716
TEAM MEMBERS	R. Boucher, H. Savile, D. Whyte, K. Kalter, G. Olsen	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

- To provide structural, electrical pneumatic, hydraulic, and mechanical maintenance to equipment in common use at NWRI. To maintain a specialized components store. To improve equipment and methods to benefit maintenance and testing and specifically to acquire a tension/compression test system for cables, terminations, and miscellaneous structures.-
- To provide some simple maintenance to building services.

Performance Indicators

- Maintain commonly used equipment such as coring devices, sampling devices, field centrifuges, CCIW lake platform.
- Provide limited maintenance assistance to building service.
- Acquire by purchase a machine for rolling of metal sheet and barstock.
- Contract out electrical maintenance.
- Acquire motor driven table raiser for Bridgeport Mill

Justification

Equipment must be reliable and left in good order to ensure efficient and effective measurements and data gathering.

STUDY TITLE	Instrument Calibration Maintenance Laboratory	DIV OR ORG HD
KEY WORDS	MAINTENANCE, CALIBRATION, INSTRUMENTATION, STORES, PROJECTIONIST	SEC'N OR GRP MANTEC
STUDY LEADER	Mollon, K	TEL: 637-4297 PAE 1716
TEAM MEMBERS	L. Peer, J. Thomson	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

- To continue the maintenance and calibration of common user instrumentation and equipment through efficient use of specialty skills where required.
- To update general test equipment and eliminate obsolete instruments.
- To improve equipment and methods where it is straightforward and economical.
- To train a new employee to be proficient at instrument maintenance.

Performance Indicators

- Maintain the following classes of gear: meteorology packs sensors, chart recorders, special sensors and systems; ECSG test and calibration gear; and main auditorium audio visual equipment.
- Maintain electronic stores.
- Provide projectionist services for main auditorium.
- Purchase test instruments and facilities to enhance the capability of the maintenance work such as increased reliability of equipment.
- Transfer maintenance knowledge and train personnel in new systems or instruments.
- Keep up the calibration facility for electrical standards, temperature, humidity, conductivity, compass direction, and oxygen pressure.

This is an ongoing function

Justification

Accurate calibration of instruments is essential for all measurements. Scientific and monitoring programs depend on regular and efficient calibration. Instruments must be maintained for efficiency and effectiveness.

STUDY TITLE	PILP* Involvement	DIV OR ORG HD
KEY WORDS	PROGRAM FOR INDUSTRIAL LABORATORIES TECHNOLOGY TRANSFER	SEC'N OR GRP ENSRVS
STUDY LEADER	Ford, J.S.	TEL: 637-4310 PAE 1716
TEAM MEMBERS	A.S. Watson, J. Valdmanis, F. Roy, A. Pashley, R. Desrosiers	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

To identify instrument or system developments which could possibly be marketable by the private sector and inform the PILP evaluation committee.

Performance Indicators

Provide prompt assistance, advice and consultation to developers selected for funding by PILP organization and also give prompt advice to the PILP committee.

*PILP is the acronym for Program for Industry Laboratory Project.

Justification

Each year a number of instrument systems developed by Engineering Services Section have been proposed to the PILP Evaluation Committee. These instruments are candidates for technology transfer to Canadian industry. It is anticipated that one such instrument will be selected for a PILP project during 1983/84.

STUDY TITLE	Flood Forecasting Ice Thickness Measuring	DIV OR ORG HD
KEY WORDS	FLOOD FORECASTING, ICE, INSTRUMENTATION	SEC'N OR GRP ENSRVS
STUDY LEADER	Watson, A.S.	TEL: 637-4262 PAE 1716
TEAM MEMBERS	Dr. S. Beltaos, J. Dolanjski	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

Following a review of the various measurement technologies, to identify, obtain, and demonstrate in the field (in conjunciton with MOE, New Brunswick) the most promising instrument to measure and record the thickness of floating ice on rivers.

Performance Indicators

- Complete technology review report.
- Arrange financial support.

Justification

The instrument was requested by the Forecast Centre and River Ice Committee of Environment, New Brunswick (Mr. J.G. Lockhart, Director - File No. 1438-1). The thickness of river ice is an important variable in jamming and flood statistics

Interest in this development has also been mentioned by NHRI staff and various staff in regions.

STUDY TITLE	Frazil Ice Recorder	DIV OR ORG HD
KEY WORDS	FRAZIL ICE, FLOOD FORECASTING	SEC'N OR GRP ENSRVS
STUDY LEADER	Ford, J.S.	TEL: 637-4310 PAE 1716
TEAM MEMBERS	N. Madsen	DATE 83/02/02
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

To produce a working prototype of a Frazil Ice Recorder for field use and install it in the field for winter 83/84

Performance Indicators

- Analysis of data obtained from last year's lab and field testing with breadboard equipment.
- Design and build instrument and related field equipment.
- Final bench test, installed in New Brunswick and monitor.

Justification

The Forecast Centre and River Ice Committee of Environment New Brunswick requested development (File 1438-1). The amount of Frazil Ice in the water can greatly affect the tendency to flooding and clogging of water intakes.

STUDY TITLE	Engineering Support to NWRI Research Projects		DIV OR ORG HD
KEY WORDS	NWRI, SUPPORT		SEC'N OR GRP ENSRVS
STUDY LEADER	TBA	TEL: 637-4	PAE 1716
TEAM MEMBERS	Various, according to need		DATE 83/02/02
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)		

Goals

To provide engineering services to the following organizations of NWRI:

Director's Office
 Hydraulics Division
 Analytical Methods Division
 Aquatic Physics & Systems Division
 Technical Operations Division
 Environmental Contaminants Division
 Aquatic Ecology Division

Performance Indicators

Engineering Services Section was created to provide service to the research program of NWRI.

Justification

To provide all classes of engineering skills to solve problems in NWRI. This does not include drafting services.

AQUATIC ECOLOGY DIVISION

SECTION STUDY

STUDY TITLE

STUDY LEADER

83/06/15.

DIVISION

AQUATIC ECOLOGY RESEARCH MANAGEMENT AND ADMINISTRATION

BARICA, J.

AQUATIC WEEDS	4.72 4.74 4.77 4.78 4.79 4.91	LAKE ACIDIFICATION & SEDIMENT TRACE METAL RELEASE IN MACROPHYTE LAKES CONTAMINANT CONTENT OF AQUATIC MACROPHYTES IN A CONTAMINATED STREAM CONTROL OF EURASIAN WATERMILFOIL AQUATIC MACROPHYTES AND ACID RAIN CLADOPHORA IN THE GREAT LAKES TASTE AND ODOUR PROBLEM IN DRINKING WATER FROM L. ONTARIO	CARIGNAN, R. PAINTER, S. PAINTER, S. PAINTER, S. PAINTER, S. PAINTER, S.
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ECOLOGICAL IMPACT

4.06 EFFECTS OF CLIMATIC CHANGE ON WATER QUALITY
 4.07 STATISTICAL ANALYSES OF ENVIRONMENTAL DATA
 4.10 EFFECTS OF ACIDIFICATION ON ORGANIC MATTER CYCLING IN SHIELD LAKES
 4.11 METAL CYCLES IN SOFTWATER LAKES IN RELATION TO LAKE ACIDIFICATION
 4.12 SULFUR AND SELENIUM POLLUTION OF SOFTWATER LAKES IN NORTHERN ONTARIO
 4.13 ATMOSPHERIC DEPOSITION FROM COAL-FIRED POWER PLANTS
 4.15 IMPACT OF PEAT AS AN ENERGY SOURCE UPON NORTHERN AQUATIC ECOSYSTEMS
 4.16 PALEOLIMNOLOGY OF ACID SUSCEPTIBLE LAKES
 4.18 BIOGEOCHEMICAL PROCESSES IN GREAT LAKES SEDIMENTS—PALEOENVIRONMENT
 4.19 ARSENIC AND SELENIUM POLLUTION OF THE GREAT LAKES
 4.92 SEDIMENT BANK — GREAT LAKES

GREAT LAKES

4.20 SEDIMENT PHOSPHORUS REGENERATION IN LAKE ERIE
 4.21 NUTRIENT PROCESSES AT DIFFERENT THERMAL STRATAS IN LAKE ONTARIO(1982)
 4.23 AQUATIC INVERTEBRATES AS INDICATORS OF ENVIRONMENTAL CHANGE
 4.24 GREAT LAKES WATER CHEMISTRY ATLASES, VOL. 2, LAKE ERIE
 4.25 NUTRIENT AND CONTAMINANT TRANSPORT AND SEDIMENT MOVEMENT IN L. ONTARIO
 4.28 BIOAVAILABILITY OF PHOSPHORUS
 4.93 PRODUCTIVITY AND PHOSPHORUS LIMITATION IN LAKE SUPERIOR PHYTOPLANKTON
 4.97 LAKE ERIE SURVEILLANCE CONTINUITY
 4.98 CLADOPHORA ABUNDANCE IN L. ONTARIO AND NEARSHORE AESTHETICS

NUTRIENT PATHWAYS

4.32 DYNAMICS OF NUTRIENTS AND ORGANIC SUBSTANCES IN POLLUTED SYSTEMS
 4.33 ASSESSMENT OF MICROBIAL ACTIVITIES IN FRESHWATER ECOSYSTEMS
 4.34 BINDING CAPACITY OF LAKE WATER POLYSACCHARIDES
 4.36 PHYSIOLOGICAL IMPACT OF ORGANIC COLLOIDAL FIBRILS IN LAKE WATER
 4.37 REGULATING PHYTOPLANKTON BY COPRECIPITATION OF PHOSPHATE WITH CALCITE
 4.38 NUTRIENT TRANSFORMATIONS IN LAKES/BIOSYNTHESIS-CONTAMINANT INHIBITION
 4.39 LAKE RESTORATION BY HYDROSTATIC AERATION
 4.40 CALCITE PRECIPITATION EFFECT ON PHOSPHATE IN L. ONTARIO THERMAL BAR
 4.94 L. ONTARIO NUTRIENT ASSESSMENT STUDY (LONAS)

ROSA, F.

ROSA, F.

KALAS, L.

DOBSON, H. F. H.

CHARLTON, M. N.

MANNING, P. G.

CHARLTON, M. N.

1

2

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA M-			EXTERNAL			SHADOW			TOTAL RESOURCES--				
	PY SAL	OM	CAP	FY SAL	OM	CAP	FY SAL	C4	CAP	CVT	PY SAL	AGCY	PY SAL	OM	CAP	COST	PY SAL	OM	CAP	COST	PY SAL	OM	
401	2.00	74	75.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.00	74	75.0	
406	1.00	35	6.4	4.05	--	--	--	--	.36	2	.5	--	.6	.03	1	--	--	.3	1.09	39	6.9	4.5	
406	1.00	35	6.4	4.05	--	--	--	--	--	--	--	--	--	SHADOW TOPS	--	--	--	--	--	50.3	--	--	
407	.90	30	7.3	3.05	--	--	--	--	--	--	--	--	.20	7	--	--	--	--	1.10	37	7.3	3.5	
410	.50	16	11.8	--	.34	11	1.2	--	.25	7	--	--	.05	2COSEP	.30	2	--	--	1.044	38	13.0	--	
411	1.30	45	8.1	4.05	--	--	--	--	.38	11	4.5	--	1.05	--	--	--	--	--	.5	2.0	--	50.7	
411	1.30	45	8.1	4.05	--	--	--	--	--	--	--	--	SHADOW TOPS COSEP	.30	2	--	--	--	1.98	60	12.6	4.5	
412	1.50	55	8.1	5.0	--	--	--	--	.30	9	4.0	--	2.05	--	-LRATAP	--	--	16.0	--	4.0	2.10	69	
412	1.50	55	8.1	5.0	--	--	--	--	--	--	--	--	SHADOW TOPS COSEP	.30	2	--	--	--	26.1	5.0	--	105.9	
415	1.05	55	8.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.35	57	8.8	--	
416	1.05	36	7.04	6.0	.15	5	.05	--	--	--	--	--	--	--	--	--	--	--	1.20	41	7.9	6.0	
418	1.10	38	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.10	38	1.0	--	
419	.40	16	9.1	4.05	.16	5	.07	7.0	--	--	--	--	.05	2	--	--	--	--	.61	23	9.8	11.5	
420	.50	18	3.0	2.0	.30	10	2.05	1.04	.084	25	4.3	--	10.0	.14	5COSEP	.30	2	--	--	101.2	2.08	70	
420	.50	18	3.0	2.0	.30	10	2.05	1.04	.084	25	4.3	--	SHADOW DFO	SHIPS	--	--	--	--	101.2	2.08	70	10.3	
421	.50	16	2.5	--	--	--	--	--	--	--	--	--	.08	3	--	--	--	--	19	2.05	--	21.1	
421	.50	16	2.5	--	--	--	--	--	--	--	--	--	SHADOW INDNT ANLYS	--	--	--	--	--	0.0	.56	--	--	
423	1.00	46	2.05	--	--	--	--	--	.32	9	1.0	--	.05	--	-COSEP	.30	2	--	--	5.0	1.62	58	
423	1.00	46	2.05	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	--	--	5.0	3.05	--	66.0	
424	1.00	30	2.0	--	--	--	--	--	--	--	--	--	.02	1	--	--	--	--	1.02	31	2.0	--	
425	1.50	45	3.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32.7	--	--	--	
425	1.50	45	3.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	149.7	2.99	93	11.0	
428	1.00	51	5.0	35.0	--	--	--	--	.10	3	1.05	--	--	--	--	--	--	--	1.05	1.10	54	6.05	
428	1.00	51	5.0	35.0	--	--	--	--	.20	6	2.0	--	1.05	--	-COSEP	.30	2	--	--	2.02	67	9.0	6.0
432	1.70	57	7.0	6.0	--	--	--	--	--	--	--	--	SHADOW TOPS	--	--	--	--	--	2.01	2.02	--	63.9	
433	.80	29	4.05	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.80	29	4.05	5.0	
434	1.00	35	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	35	4.0	--	
436	1.60	58	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.6J	50	5.0	--	
437	1.45	46	10.0	1.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	63.0	--	--	
437	1.45	46	10.0	1.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.05	53	19.5	1.5	
438	.70	23	5.0	10.0	--	--	--	--	.20	6	2.0	--	2.0	.07	2	--	--	--	33	7.0	10.0	--	
438	.70	23	5.0	10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.02	37	2.02	--	

PROCESSING FORM FOR DIVISION AED

DATE RUN 33/06/13.

NO	ORGANIZATION				ENGINEERING				TECHNICAL OPERATIONS				DATA M- EXTERNAL				SHADOW				TOTAL RESOURCES				TOTAL COST						
	FY SAL	CM	CAP	FY SAL	FY SAL	CM	CAP	FY SAL	CM	CAP	OVM	FY SAL	AGCY	FY SAL	CM	GAP	CUST	FY SAL	CM	GAP	CUST	FY SAL	CM	GAP	CUST	FY SAL	CM				
439	.20	6	2.5	2.5	--	--	--	.01	1	1.5	--	--	--	SHADOW DFO	SHIPS	--	--	.5	.021	7	4.0	2.5	14.0	--	--	--	--	--			
439	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	--	--	1.00	2.9	--	--	25.0	--	--	--	--	--		
472	1.00	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
474	.20	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.2	--	--	--	--	--	--	--	6.2			
477	.90	25	--	--	--	--	--	--	.02	1	.2	--	--	--	--	--	--	--	--	21.0	13.5	--	--	--	--	--	--	--			
477	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFC	SHIPS	30	2	--	--	1.05	1.22	28	21.2	13.5	64.2	--	--	--	--	
478	.35	10	--	--	--	--	--	--	.03	1	.3	--	--	--	--	--	--	--	--	1.08	6.5	.5	.38	11	2.1	6.5	20.1	--			
478	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	--	--	--	--	--	--	--	--	--	--	--	
479	.20	7	--	--	--	--	--	--	--	--	--	--	--	--	.07	2COSEP	30	2	--	--	.57	1.2	47.0	--	--	58.6	--	--	--	--	
479	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	IND	--	--	47.0	--	--	--	--	--	--	--	--	--	--		
490	.35	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	GLWQA	--	--	8.6	2.6	.35	12	8.6	2.6	23.2	--	--	--	--	
491	.40	13	--	--	--	--	--	--	.02	6	.1	--	--	--	--	--	GLWQA	--	--	10.0	--	--	--	--	--	--	30.3	--	--	--	--
491	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	1.2	.42	19	10.1	--	--	--	--	--	--		
492	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	GLWQA	--	--	6.0	--	--	--	--	--	--	--	6.0	--		
493	.20	6	4.0	--	--	--	--	.25	7	5.0	--	2.5	--	--	--	SHADOW INDONT	ANLYS	--	--	11.0	--	--	--	--	--	--	--	--	--		
493	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	COSEP	30	2	--	--	--	--	--	--	--	--	--	--	--		
493	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	25.0	.75	18	20.0	--	--	--	--	62.8			
494	1.90	68	--	--	--	--	--	.20	6	1.5	--	2.05	--	--	--	GLWQA	--	--	30.0	--	--	--	--	--	--	--	--	133.0	--		
494	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	25.0	2.10	77	31.5	--	--	--	--	--	--		
495	.70	20	--	--	--	.03	1	--	.61	16	4.0	--	9.0	.15	5GLWQA	.50	27	25.9	--	--	100.0	1.99	80	29.3	--	--	209.9	--			
495	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	30	2	--	--	--	--	--	--	--	--	--	--	--	
497	.10	3	3.5	--	.63	30	.6	1.9	.36	11	3.0	--	1.0	.14	5GLWQA	--	--	7.0	3.0	--	--	--	--	--	--	--	--	2493.6			
497	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	30	2	--	--	--	--	--	--	--	--	--	--	--	
498	.45	14	--	--	--	--	--	--	.30	9	.5	--	--	--	--	GLWQA	--	--	30.0	--	--	--	--	--	--	--	--	--	54.5		
498	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SHADOW DFO	SHIPS	--	--	1.0	.75	23	30.5	--	--	--	--	--	--		
30.50	1073	207.0	90.0	1.01	62	5.5	10.3	5.74	4.84	176	46.0	--	46.0	33	4.40	55	219.5	25.6	--	442.5	43.45	4445	1445	125.9	--	--	--	--			

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

No: 83- 401

STUDY TITLE	Aquatic Ecology Division Research Management and Administration	DIV OR ORG AED
KEY WORDS	MANAGEMENT, ADMINISTRATION	SEC'N OR GRP AEDDIV
STUDY LEADER	Barica, J.	TEL: 637-4227
TEAM MEMBERS	J. Major, F. Boyd (SSD)	PAE 1714
ECS PROGRAM	Water Management Research	DATE 82/10/02
ACTIV ELEM	Aquatic Ecology	

Goals

Plan, organize, manage and control the scientific and administrative program of the Aquatic Ecology Division.

Performance Indicators

1. Coordinate study plan preparation including quarterly written study progress.
2. Liaison with other federal, provincial, private agencies, and research grant reviews.
3. Prepare staff appraisal and promotion documents.
4. Convene regular section meetings, other impromptu meetings as required for program development, biennial verbal discussions of projects with project leaders.
5. Provide secretarial services, administrative services, staff training, conference and program travel, photocopier and word processing services.

Justification

To provide efficiency, effectiveness and economy in the Division's projects and administration of A-Base and external funding under GLWQA and LRTAP.

STUDY TITLE	Effects of Climatic Change on Water Quality	DIV OR ORG AED
KEY WORDS	CLIMATE, WATER QUALITY	SEC'N OR GRP EMPACS
STUDY LEADER	Delorme, L.D.,	TEL: 637-4317 637-4554
TEAM MEMBERS	N.S. Harper	PAE 1714 DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Two or three small lakes will be selected several tens of kilometers from the north shore of Lake Erie for paleolimnological evaluation.
2. Literature review of suitable sites and on paleoclimatic influences on lakes will be performed.
3. A statistical study of the relationship between climate, water quality, and selected living aquatic organisms will be made, based upon existing data base.

Performance Indicators

1. Acoustic profiling report, March 84.
2. Review, March 84.
3. Preliminary report, March 84.

Justification

To better understand the relationship between climate and water quality in small lake systems through time. Occasionally changes take place in the water quality of a lake system which can not be explained knowing details of the current water quality scenario. By interpreting the changes that take place through time (100's to several thousands of years) it is possible to assess the impact climatic change has had on water quality using proxy data.

STUDY TITLE	Statistical Analyses of Environmental Data: Strategy	DIV OR ORG AED
KEY WORDS	STATISTICAL MODELLING, CALIBRATION, LRTAP, WATER QUALITY	SEC'N OR GRP EMPACS
STUDY LEADER	Esterby, S.R.	TEL: 637-4362
TEAM MEMBERS		PAE 1714
ECS PROGRAM	Water Management Research	DATE 82/12/31
ACTIV ELEM	Aquatic Ecology	

Goals

1. Develop a strategy for the statistical analysis of a sequence of species-count vectors to determine changes in the sequence based on the analysis of pollen and diatom concentrations in sediment cores.
-methods also applicable to monitoring of water quality using biological indicators.
2. Extend and refine calibration relationship between species and habitat variables.
-include assessment of binary regression which is of use in relationship between contaminants (observe as absent or quantifiable) and other variables.
3. Analyse surveillance data for spatial and temporal distribution.
4. Analyse river water quality data for purpose of determining trends.

Performance Indicators

1. Report on statistical methodology, March 83.
2. Report on calibration in ecology, Apr. 84.
3. Analysis by Apr. 84.
4. Analysis by Apr. 84.

Justification

Complex sets of data are involved and improved statistical analyses are required in all cases. Results are relevant as follows: 1 and 2 to LRTAP, 1 and 3 to biological indicators of pollution, 2 to contaminants and 4 to monitoring of water quality and design.

STUDY TITLE	Effects of Acidification on Organic Matter Cycling in Shield Lakes	DIV OR ORG AED
KEY WORDS	ACID LAKES, LTRAP, GEOCHEMISTRY, ORGANICS	SEC'N OR GRP EMPACS
STUDY LEADER	Bourbonnierre, R.A.	TEL: 637-4382 PAE 4300
TEAM MEMBERS		DATE 82/12/31
ECS PROGRAM	M.C.R. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

To investigate naturally occurring organic components in shield lakes which are biochemical markers of ecological change.

- 1) GC and GC/MS analyses of unbound lipids from sediment cores (Sudbury) which were sampled, extracted and fractionated in previous years.
- 2) Prepare manuscript on Sudbury biochemical markers.
- 3) GC and GC/MS analyses of unbound lipids from suspended particulates (Sudbury) which were sampled, extracted and fractionated in previous years.
- 4) Initiate manuscript on lipid cycling in Sudbury area lakes incorporating suspended particulate, sediment and ancillary data.

Performance Indicators

- 1) Analyses by Dec. 83.
- 2) Manuscript by Mar. 84.
- 3) Analyses by Mar. 84.
- 4) Compl. in FY 84/85

Justification

This study is a continuation of previous years' work; concentration is on laboratory and data analysis and write-up of final reports.

Ecological changes caused by lake acidification affect the character, distribution and stability of organic matter residing in the various compartments of these freshwater ecosystems. Geolipids are good biochemical markers and will aid in distinguishing between natural and cultural causes of lake acidification. They can also be used to discern both long and short term changes in the properties of the lake organic matter.

STUDY TITLE	Metal Cycles in Softwater Lakes in Relation to Lake Acidification	DIV OR ORG AED
KEY WORDS	HEAVY METALS, ACID RAIN, GEOCHRONOLOGY, SEDIMENTS, GEOCHEMISTRY , SUSPENDED MATERIALS	SEC'N OR GRP EMPACS
STUDY LEADER	Wong, H.K.T.	TEL: 637-4547 PAE 4300
TEAM MEMBERS	J.O. Nriagu, R.D. Coker, P. Dillon, Student(s)	DATE 82/12/31
ECS PROGRAM	M.R.C. LRTRAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

1. To estimate directly and indirectly the flux of heavy metals into the lake water and recent sediments.
2. To assess the role of suspended particulate matter in the chemistry of selected metal species in softwater lakes.
3. To assess the changes in the rate of atmospheric loading of trace metals and other pollutants by relating the historical record of source emissions to records in recent sediments.
4. To evaluate the short and long term effects of acid precipitation on the pollutant metals accumulated in these softwater lakes.

Performance Indicators

1. Field work complete by Oct. 83 (sediment traps).
Laboratory and Data analysis Apr. 83 to June 84. (May carry over to new fiscal year if resources run out.)
2. A summary of Sudbury and Algonquin work up to 1982 complete in report form by June 83.
4. Final Report for publication in 84/85.

Justification

Little is currently known about the distribution and behaviour of heavy metals in "remote" softwater lakes that are receiving substantial input of acid precipitation and dry fallout. This study addresses this critical question of current input and behaviour of pollutant metals.

Sediment traps specially designed for small lake monitoring have been successfully tested and utilized by Wong and Nriagu in Sudbury lakes in 1982.

STUDY TITLE	Sulfur and Selenium Pollution of Softwater Lakes in Northern Ontario	DIV OR ORG AED
KEY WORDS	ACID RAIN, SULFUR, POLLUTION, LRTAP, ATMOSPHERIC DEPOSITION, SEDIMENTS, GEOCHEMISTRY	SEC'N OR GRP EMPACS
STUDY LEADER	Nriagu, J.O.	TEL: 637-4252 PAE 4300
TEAM MEMBERS	Y.K. Soon, R.D. Coker, J.O. Nriagu	DATE 82/10/29
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

1. Continue monitoring the isotopic composition of sulfur in precipitation, stream lake and groundwater samples from Turkey Lakes with a view to developing an isotope balance for sulfur to check the mass balance models for the watershed. Completion of work depends on getting necessary funding for a PDF.
2. Determine the forms of sulfur and the isotopic composition of each fraction in sediment samples from Algonquin Park (3 lakes) and Turkey Lakes to assess the role of sediments in the cycling of pollutant sulfur in lakes (Proviso-as in (1) above).
3. Evaluate the role of suspended particulates in the dynamics of selenium and sulfur in softwater lakes by measuring the concentrations of Se and the isotopic composition of S in Seston samples from Algonquin Park and Turkey Lakes.

Performance Indicators

1. Report on isotope balance for S in Turkey Lake watershed to be completed by March 84, contingent upon getting funding for a PDF.
2. Paper on role of sediments in cycling of pollutant S be completed by Feb. 84.
3. Field work and laboratory analyses of particulate S and Se to be completed by March 84.

Justification

Sulfur isotope studies and the Se/S ratios can be used to fingerprint the sources, dispersion pathways and ultimate sinks of pollutant S and Se in lakes. Both elements interact strongly with the toxic metals, and are closely linked to the problems of acid rain and lake acidification. Lakes in Algonquin Park are now showing signs of acid stress (hence the choice of this location) whereas the Turkey Lakes are not. The results of the study are aimed at meeting the objectives of the ECS Acid Rain Program.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-415

STUDY TITLE	Atmospheric Deposition from Coal-Fired Power Plants	DIV OR ORG AED
KEY WORDS	ATMOSPHERIC DEPOSITION, CONTAMINANTS, AQUATIC ENVIRONMENTS, TRACE METALS, LRTAP	SEC'N OR GRP EMPACS
STUDY LEADER	Glooschenko, W. A.	TEL: 637-4229 PAE 4300
TEAM MEMBERS	N. Arafat, R. Sims (CFS), J. Nriagu	DATE 82/12/31
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

1. To prepare a literature review on impacts of coal-fired power plants on aquatic ecosystems including lakes, streams and wetlands.
2. To conduct a baseline study (before plant is operational) of trace metals, As, Se, and S on littoral macrophytes, Sphagnum mosses, lichens, sediments, soils, and forest litter at Atikokan, Ont. To assess variability of elements in biota and sediments and set up permanent monitoring quadrants.
3. To determine yearly variability of metals in environmental samples.

Performance Indicators

1. Review completed by June 83.
2. Field sampling to be conducted in Aug 83. Laboratory analyses by Mar 84. Report by June 84.
3. Sampling of permanent quadrants in 1984, 1985 and two year intervals after plant is in operation in 1985.

Justification

Coal-fired power plants are the source of atmospheric emissions of sulfur compounds and trace metals, some of which are potentially toxic. The construction of such a plant at Atikokan, Ontario is a perfect opportunity to conduct a before and after study of contaminants in surrounding aquatic ecosystems.

STUDY TITLE	Impact of Peat as an Energy Source Upon Northern Aquatic Ecosystems.	DIV OR ORG AED
KEY WORDS	ENERGY, TRACE ELEMENTS, ECOLOGY, WETLANDS	SEC'N OR GRP EMPACS
STUDY LEADER	Glooschenko, W.A.	TEL: 637-4229 PAE 4300
TEAM MEMBERS	N. Arafat, R. Bourbonniere, Ontario MNR, EPS Ottawa	DATE 82/12/31
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

1. To assist DOE in developing policies on peatland utilization for energy production
2. To improve understanding of the environmental impact of peatland drainage and exploitation upon adjacent streams and lakes. To prepare a literature review on this topic based upon information gathered from site visits to areas of peat exploitation.
3. To develop indicator species of peatland biota (algae, invertebrates) that can be used to trace drainage impact from peat lands into nearby lakes and streams. To investigate spatial and temporal variability of such indicators as biota, peat chemistry, and water chemistry.

Performance Indicators

1. Attend DOE Peat Committee meetings as scheduled.
2. A review paper by Feb. 84.
3. Local peatlands (swamps, bogs) to be sampled during 1984 field season. Paper to be produced in FY 1984/5.

Justification

The large scale use of peat for energy production is the possible impact of such operations upon nearby lakes and streams. Such a study would enable us to predict the impact of peat mining upon aquatic ecosystems and increase our knowledge of natural acidification processes.

STUDY TITLE	Paleolimnology of Acid Susceptible Lakes	DIV OR ORG AED
KEY WORDS	LRTAP, PALEOLIMNOLOGY, ACID RAIN, ALGAE	SEC'N OR GRP EMPACS
STUDY LEADER	Delorme, L.D.	TEL: 637-4317 637-4554
TEAM MEMBERS	S.R. Esterby, N.S., Harper, H. Duthie University of Waterloo	PAE 4300 DATE 82/12/31
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

Goals

To complete the final report, which will assess status of paleolimnological analyses of acidification.

Performance Indicators

Report by March 84.

Justification

To delineate, within a time framework of the last 200 years, the changes in hydrogen ion concentrations, within a given lake, using fossils; particularly diatoms. This study was proposed for the LRTAP program to assess whether or not a given lake is naturally acidic or whether the acidity has come predominantly from anthropogenic sources. It represents a final wrap-up of the study.

STUDY TITLE	Biogeochemical Processes in Great Lakes Sediments - Paleoenvironment	DIV OR ORG AED
KEY WORDS	BIOGEOCHEMISTRY, PALEOLIMNOLOGY, IMPACT, SEDIMENTS	SEC'N OR GRP EMPACS
STUDY LEADER	Bourbonniere, R.A.	TEL: 637-4382 PAE 1714
TEAM MEMBERS	J.O. Nriagu, T. Mayer	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

A. To relate biogeochemical changes in Great Lakes sediments to paleoenvironmental conditions (in cooperation with Lakehead U., U. of Western Ontario and U. of Waterloo).

1. Collect piston cores in Lake Superior and Lake Huron
2. Prepare manuscript(s) on Lake Ontario work
3. Extraction fractionation, GC and GC/MS analyses on unbound lipids; extraction and analyses of Si, Al, Fe, Mn and P, all on a Lake Erie piston core collected in FY 82/83

B. To determine present and historical fluxes of organic and inorganic components in high sedimentation rate areas of each of the Great Lakes and model time-dependent input and transformation processes (in coorperation with E. Halfon, APSD, J. Carey and B. Oliver, ECD, and M. Charlton AED).

1. Intensive sampling L. Ontario in support of cooperation modelling effort (APSD, ECD, AED)
2. Prepare manuscript on unbound lipids in L. Ontario cores analyzed in previous years.
3. L. Superior and L. Huron sampling for cooperative program
4. Extraction, fractionation, GC and GC/MS analyses on unbound lipids; extraction and analyses of Si, Al, Fe, Mn and P, all on 3-5 cores from L. Erie collected in FY 82/83
5. Prepare manuscript on data from L. Erie, Central Basin core

Performance Indicators

A. 1. Cruise: Jul. 83. 2. MS by Dec. 83. 3. Analyses by March 84.
 B. 1. Cruise: May 83. 2. MS by June 83. 3. Cruises July 83.
 4. Continuing into FY 84/85. 5. MS by March 84.

Justification

We must build upon knowledge of paleoenvironmental events in order to understand the significance and ecological impact of present-day and future geochemical events. This study relates to the international effort to rehabilitate and manage the Great Lakes Basin.

STUDY TITLE	Sediment Phosphorus Regeneration in Lake Erie	DIV OR ORG AED
KEY WORDS	PHOSPHORUS, LAKE ERIE, BIOAVAILABILITY, SEDIMENTS	SEC'N OR GRP GRLICS
STUDY LEADER	Rosa, F.	TEL: 637-4246 PAE 1714
TEAM MEMBERS	P.G. Manning	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Four cruises will be carried out from June to Sept. on the Central Basin of Lake Erie. Near bottom sedimentation and concentration will be measured. (F. Rosa).
2. Near bottom and sediment chemical gradients will be measured using peepers (R. Carignan). Different "P" fractions will be analyzed for (P.G. Manning).
3. This research is specifically aimed at understanding the near bottom phosphorus cycling mechanism and how this mechanism contributes to internal loading.
4. This will be the first year trial, and it is hoped that the research will be expanded to the three Lake Erie basins, and other lakes in the next 5 years. A data summary of research contributions will be written in report form.

Performance Indicators

1. Complete four research cruises by Sept. 83.
2. Subject to GLWQA funding.
3. Complete preliminary data analysis by Feb 84.
4. Complete Data summary report by June 84.

Justification

Phosphorus is the limiting nutrient for algal growth, thus measures to reduce "P" loadings have been introduced. Internal loading (sediment to water) of the different "P" forms and other nutrients has to be understood and quantified, before any statement on the recovery rate of lakes can be made by management.

NATIONAL WATER RESEARCH INSTITUTE

Study PlanNO: 83-421

STUDY TITLE	Nutrient Processes at Different Thermal Stratas in Lake Ontario (1982)	DIV OR ORG AED
KEY WORDS	LAKE ONTARIO, PHOSPHORUS, EUTROPHICATION	SEC'N OR GRP GRLICS
STUDY LEADER	Rosa, F.	TEL: 637-4246 PAE 1714
TEAM MEMBERS		DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To determine the variability of chemical constituents at different thermal stratas in Lake Ontario for 1982.

Performance Indicators

1. Commence data analysis as soon as CCIW files are complete (~ April 83)
2. Complete data summary by Mar 84.

Justification

The Lake Ontario whole lake and bioindex surveillance data will be analyzed for the different thermal stratas and compared. Since the same station pattern and sampling frequency were maintained for 1981 and 82, this will allow an accurate examination of data collected where the only variable is year. Year to year variability in the chemical constituents in lakes has been used to determine changes in eutrophication irregardless in the inconsistency in sampling space and time. This study not only will allow the examination of nutrient processes using the same procedures, but also will compare processes between the two years.

STUDY TITLE	Aquatic Invertebrates as Indicators of Environmental Change	DIV OR ORG AED
KEY WORDS	EUTROPHICATION, TOXIC SUBSTANCE, GREAT LAKES WATER QUALITY, BENTHOS, NIAGARA RIVER	SEC'N OR GRP GRЛИCS
STUDY LEADER	Kalas, L.	TEL: 637-4389 PAE 1714
TEAM MEMBERS	I. Sekerka, R.A. Bourbonniere	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To sample macrozoobenthos throughout Lake Ontario to determine the character and extent of changes in offshore biota since earlier surveys; to interpret ecozoobenthological distributional patterns with pollution and nutrient inputs and some physical factors.

Performance Indicators

1. Processing and comparison of the available GLFRB and other records from the past benthological surveys (January-October 83).
2. Resampling a few critical ecobenthological stations on the Niagara River plume grid studied in 1982 (June 83).
3. Carrying out grab and core sampling at about 50 new stations situated across the lake and the Rochester area (June and September 1983).
4. Improving, constructing and testing two sampling devices: a Schindler's sampler and a haul net (July 1983).
5. Testing and operating a novel assembly designed to observe ecotoxicology of invertebrates under variously simulated water quality conditions on bottom sediment samples - water interface within a few months after collecting them (January -December 1983).
6. Two expected final reports, one dealing with the laboratory observations and the other on historical records and results from the ecobenthological cruises, will be submitted by December and March 1984 respectively.

Justification

The preliminary results on 1981-82 ecobenthological surveillance of the Lake Ontario biota show that data on invertebrate diversity and abundance even when gathered only once or twice a year per station yield important information complementary to other limnological techniques. The integrating records difficult or impossible to obtain by other means, if reliable, will allow us to predict the course of future eutrophication trends and events that may be undesirable or perilous to aquatic life.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-⁴²⁴

STUDY TITLE	Great Lakes Water Chemistry Atlases, Vol. 2, Lake Erie.	DIV OR ORG AED
KEY WORDS	ATLAS; DATA, HISTORICAL; EUTROPHICATION; GREAT LAKES SURVEILLANCE; LAKE ERIE; NUTRIENTS; OXYGEN, DISSOLVED; PHOSPHORUS; PHYTOPLANKTON; POLLUTION; TRACE METALS;	SEC'N OR GRP GRPLCS
STUDY LEADER	TRENDS; WATER QUALITY. Dobson, H.F.H.	TEL: 637-4506 PAE 1140
TEAM MEMBERS		DATE 82/12/31
ECS PROGRAM	Canada/U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI & Regional Involvements in Canada-U.S. & Interprovincial Waters	

Goals

To produce a comprehensive graphical atlas and text of Lake Erie waters' chemical constituents, using mainly the CCIW Lake Erie data base for 1966 to 1982. Emphasis will be on nutrients, particulate organic matter, and oxygen, all in relation to phosphorus loading control and also major ions and trace metals.

Performance Indicators

1. December 1983: give a CCIW seminar on progress and highlights.
2. March 1984: submit draft of Atlas for first critical review.

Justification

The IJC Commissioners have recently called for intensified Great Lakes water quality interpretive science. The atlas will give a new view of Lake Erie's chemistry, biology, and secondarily physics, more insight into the importance of natural versus human influences, and an update on the lake's impending recovery from eutrophication.

STUDY TITLE	Nutrient and Contaminant Transport and Sediment Movement in Lake Ontario	DIV OR ORG AED
KEY WORDS	EUTROPHICATION, CONTAMINANTS, TRANSPORT, ALGAL GROWTH, DECOMPOSITION, NIAGARA RIVER	SEC'N OR GRP GRLICS
STUDY LEADER	Charlton, M.N.	TEL: 637-4589 PAE 1714
TEAM MEMBERS	R. Bourbonniere, J. Carey, E. Halfon, B. Oliver	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Installation of sediment traps throughout L. Ontario to measure the downflux of nutrients, organic matter and contaminants April - Oct 83.
2. Study of the movement of Mirex by uptake resuspension and redeposition as a model contaminant in L. Ontario.
3. Completion of manuscripts on relationship between eutrophication and organic sedimentation in L. Erie, L. Ontario and Niagara River Area.

Performance Indicators

1. Preparation of one manuscript related to sediment trapping and productivity in each of L. Erie and L. Ontario.
2. Installation and recovery of sediment traps at 10 stations during 6 intervals in L. Ontario beginning April 1983.
3. Preparation of report on lakewide nutrient downfluxes March 84
4. Preparation of cooperative report on contaminant movement March 84.

Justification

The interaction between eutrophication and the fate of contaminants is at present unknown. This study extends previous work to add to knowledge of movement of one well documented contaminant (Mirex) as a model substance.

STUDY TITLE	Bioavailability of Phosphorus	DIV OR ORG AED
KEY WORDS	PHOSPHORUS, AVAILABILITY, IRON, SEDIMENTS LAKE ERIE	SEC'N OR GRP GRЛИCS
STUDY LEADER	Manning, P.G.	TEL: 637-4229 PAE 1714
TEAM MEMBERS	F. Rosa	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To advance knowledge of P-Fe relationships in abatement of eutrophication through:

1. Initiation of new studies on bioavailable P in suspended river sediment and in adjacent near-shore areas. A suitable river is to be chosen, probably on L. Erie.
2. Continuation of measurement of NAIP, Fe (OH)₃ and hence, bioavailable P in surficial muds of the Central Basin of L. Erie. This should yield maximum concentrations of regenerated P over a representative area of the Central Basin. The results will complement the few data already collected to give a broad picture for the Basin.

Performance Indicators

1. Suspended sediment will be collected in summer 83 and subject to NAIP, Fe fractionation using extraction and Mössbauer methods. Feasibility study completion by April 84.
2. Ten cores to be retrieved in summer of 83, along a line joining Erieau and Cleveland. Extraction and Mössbauering will run from Sept. 83 - Sept. 85. Completion Sept. 85

Justification

Chemical extraction studies do not indicate the proportion of NAIP that is bioavailable. It is hypothesized that Fe(OH)₃-P is the main source of regenerated P and Mössbauer methods seem the only method of measuring Fe(OH)₃

STUDY TITLE	Dynamics of Nutrients and Organic Substances in Polluted Systems	DIV OR ORG AED
KEY WORDS	AMMONIA, NITRIFICATION, MODELS, NUTRIENTS, ORGANICS	SEC'N OR GRP NUPROS
STUDY LEADER	Brownlee, B.	TEL: 637-4221 PAE 1714
TEAM MEMBERS	G.A. MacInnis	DATE 82/12/31
ECS PROGRAM		
ACTIV ELEM		

Goals

The majority of our work will consist of completing the sample and data analysis from the previous three years' field work, and writing up results. Some field experiments will be done on Canagagigue Creek to test various aspects of the ammonia model. The possibility of applying this model to a large river will be examined. Laboratory experiments will be done to further develop the use of aquariums with natural populations to study rates and processes of nutrient and organic cycling. Specific goals:

1. To finalize the ammonia model for polluted streams.
2. Nitrification experiments using natural populations in aquariums.
3. Analyze samples from the N-15 enclosure experiment done in Yellow Lake pothole in June, 1982.
4. Complete and write up other parts of the Canagagigue Creek study.
5. Write general plotting program for TRS-80 Model III and HP 7470. (Subject to availability of commercial software.).

Performance Indicators

1. Model testing Oct 83, final model by Mar 84.
2. Set up system June 83, Complete expts. Dec 83.
3. Sample analysis Dec 83, report by Mar 84.
4. Two manuscripts Mar 84.
5. Program by Mar 84.

Justification

1. The purpose of the ammonia model is to predict total and unionized ammonia concentrations. Ammonia is both a nutrient and a potential toxic substance.
2. The aquarium systems may be one way of studying nutrient-organic interactions.
3. Some aspects of past and present work are indirectly relevant to Regional needs: a) 5101, site specific confidence limits for water-quality parameters and b) 5121, sensitive analytical methods for low molecular weight N and P compounds.

STUDY TITLE	Assessment of Microbial Activities in Freshwater Ecosystems	DIV OR ORG AED
KEY WORDS	BACTERIA, PROTEOLYSIS, DEHYDROGENASE	SEC'N OR GRP NUPROS
STUDY LEADER	Burnison, B.K.	TEL: 637-4706 PAE 1714
TEAM MEMBERS	D.J. Nuttley	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

The initial year of this study include a literature survey to gather together "state-of-the-art" techniques to assess the microbial activities in the water column and sediments, namely:

1. Dehydrogenase activity in sediments and in plankton will be determined and assessed for suitability as a quick measure for microbial activity.
2. Proteolytic activity of bacteria will be determined using various protein substrates.
3. Heterotrophic potential methodology will be studied and a feasibility report on the usefulness of such measurements will be made.

Performance Indicators

1. Preliminary report by Dec 83.
2. Preliminary report by Oct 83.
3. Report by March 84.

Justification

The role of bacteria in freshwater is still in a qualitative state. The rate that bacteria degrade particulate and dissolved organic matter is imperative before we can quantitatively model the nutrient (C,P,N) recycling in natural waters. Over the past decade numerous methodolgies have been advanced to give certain insights into the microbial environment. Most techniques have inherent disadvantages and time must be allocated to assess the numerous methods. These techniques can be used not only for assessing microbial activities in aquatic environments, but to determine the effect of toxicants in these same environments.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-434

STUDY TITLE	Binding Capacity of Lake Water Polysaccharides	DIV OR ORG AED
KEY WORDS	FIBRILS, ORGANICS, METALS, AVAILABILITY	SEC'N OR GRP NUPROS
STUDY LEADER	Burnison, B.K.	TEL: 637-4706 PAE 1714
TEAM MEMBERS	D.J. Nuttley	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To determine the binding capacity of the polysaccharide fractions which we have isolated from lake water. The specific goals are:

1. To determine the complexing capacity of various heavy metals to the polysaccharide fractions using gel permeation techniques.
2. To determine the binding capacity of selected organic contaminants to the polysaccharide fractions.
3. To write up manuscripts on previous experiments.

Performance Indicators

1. Experiments completed by Dec. 83.
2. Experiments completed by March 84.
3. Two manuscripts completed by March 84.

Justification

The role of these ubiquitous compounds in the aquatic environment is very important and complex and is made even more so with present inadequate techniques. Until we have a definite answer about the involvement of these colloids in metal binding and organic contaminant adsorption, we can not quantitatively assess the impact that these pollutants have on aquatic life. This research is relevant to IWD Regional needs (a) 5791, heavy metal adsorption /desorption and mobilization; (b) 5323 bioavailability of trace organics.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan**NO: 83-436**

STUDY TITLE	Physiological Impact of Organic Colloidal Fibrils in Lake Water	DIV OR ORG AED
KEY WORDS	FIBRILS, LAKE WATER, PHYSIOLOGY, ORGANICS, FLOCCULATION, ACIDITY, MICROBES	SEC'N OR GRP NUPROS
STUDY LEADER	Leppard, G.G.	TEL: 637-4232
TEAM MEMBERS	B.K. Burnison, D. Paolini, T. Murphy, S. Rao	PAE 1714
ECS PROGRAM	Water Management Research	DATE 82/12/31
ACTIV ELEM	Aquatic Ecology	

GOALS

A. To ascertain the physiological functions in lake water of organic colloidal fibrils. Specifically, we wish to know 1) if there is binding by fibrils of P, Fe and Pb and if so, 2) what impact such binding has on lake physiology, e.g. modification of bioavailability.

B. Specific Investigations:

1. Assay of fibrils for phosphatase activity.
2. Detailed binding studies (see above) assigned to various external labs, principally to those of H.W. Nurnberg in Julich, West Germany, with this work to be monitored by G.G. Leppard.
3. Feasibility study to relate water quality to fibril flocculation (Murphy, AED-437) principally pH effects as shown by Freeze-etch technology.
4. To study contact relations of fibrils to cell surfaces (with Rao, AMD).

Performance Indicators

A.1. Production of 2 manuscripts on the preparation of fibril fractions for assays Mar 84.

2. Data collection on the chemistry of fibril-trace element associations (P, Fe and Pb) Mar 84.

B.1. Data Collection March 84.

2. Data collection March 84.

3. Data collection March 84.

4. Supplement to ongoing data collection March 84.

Justification

The fibrils were an important component of 97% of water samples from a 10-lake survey carried out from 1977 to 1982 by NWRI. In 55% of these samples, the fibrils were the single most abundant organic material seen, with improved quantitation giving figures indicating that fibril levels can be as high as 35% of the mass of "dissolved" organic carbon. Circumstantial evidence has implicated them in flocculation phenomena and binding phenomena.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

No: 83-437

STUDY TITLE	Regulating Phytoplankton Coprecipitation of Phosphate with Calcite	DIV OR ORG AED
KEY WORDS	PHOSPHATE, MANAGEMENT, LAKE RESTORATION	SEC'N OR GRP NUPROS
STUDY LEADER	Murphy, T.	TEL: 637-4221 PAE 1714
TEAM MEMBERS	B.G. Brownlee, D. Paolini, and G. Leppard IWD-P&Y: C. Gray; U.B.C: K. Hall; Fish and Wildlife B.C.: C. Bull	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. To investigate the carbonate-phosphate chemistry of induced calcite precipitation reactions.
2. To evaluate the effect of liming a small hypertrophic lake, that has a high phosphate concentration, on phosphorus and chlorophyll levels.
3. To study naturally occurring phosphate-carbonate reactions and the effect of colloidal and dissolved organic substances on calcite stability.
4. Evaluate the carbonate and phosphate chemistry of Chain Lake, a hypertrophic lake in need of an in-lake restoration technique.

Performance Indicators

1. The development of a cost effective lake management technique. March 84.
2. Liming of Black Lake, B.C. by Sept. 83. Report available March 84.
3. Determine which lakes would respond well to this carbonate method of lake restoration and how much lime would be needed to restore a lake. March 84.
4. Report available in March 84.

Justification

The Fish and Wildlife Branch of B.C. has requested help in restoring eutrophic lakes. The IWD Pacific region considers this study part of their lake restoration study of the Okanagan Valley. Many lakes in the dry interior of B.C. have high loadings of phosphorus derived from richapatite deposits, or wastes from cattle or people. The cattle must be kept in the valleys for the winter and sewage systems are difficult to build in the mountains. These natural and cultural problems require an in-lake restoration technique. The 1982 study confirmed that the carbonate chemistry does control phosphate availability; however, attempts to enhance the calcite precipitation with nitrate or aeration, performed previously, were not successful enough to be used as restoration tools. Simple lime treatments did appear very cost-effective in precipitating phosphate but we need to know more about the stoichiometry of the reaction before we can give IWD-P&Y and the Fish and Wildlife Branch the advice they need: How do we determine which lake will respond well? How much will it cost? and how long will the treatment be effective?

NATIONAL WATER RESEARCH INSTITUTE Study Plan

No: 83- 438

STUDY TITLE	Nutrient Transformations in Lakes/Biosynthesis-Contaminant Inhibition	DIV OR ORG AED
KEY WORDS	NUTRIENTS, EUTROPHICATION, CONTAMINANTS, SEDIMENTS, MICROBIOLOGY, PHYTOPLANKTON	SEC'N OR GRP NUPROS
STUDY LEADER	Lean, D.R.S.	TEL: 637-4589
TEAM MEMBERS	K. Edmondson, A. Abbott	PAE 1714
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Complete publications on previous work on techniques to assess nutrient limitation and on the interrelationships between nutrient uptake, algal growth, and zooplankton excretion.
2. Complete data processing and manuscript preparation on the influence of P regeneration from sediments (in collaboration with R. Carignan).
3. Experiments on nitrification and denitrification and the development of sensitive bioassays to quantify these processes are underway (in collaboration with R. Knowles, McDonald College).
4. Interactions between nutrient loading and detoxification rates of selected herbicides and pesticides are determined in large enclosures at Lake St. George. This is in collaboration with Kaushik and Solomon, Guelph University.
5. Preliminary experiments using fluorescent microscopy and autoradiography will be used to determine the percent metabolically active bacteria and microalgae and rate they are eaten by microscopic animals (flagellates and ciliates).
6. Determine natural rates of NO_3^- and SO_4^{2-} assimilatory processes. These result in OH production and will neutralize the H⁺ associated with acid rain.

Performance Indicators

1. 3 papers to be submitted before March 1984.
2. 2 papers expected to be completed before March 1984.
3. 1 publication to follow extensive data analysis expected by March 1984.
4. Preliminary experiments to be analysed and field work to continue to March 1984.
5. Experiments to be initiated during the next year.
6. Preliminary experiments are underway.

Justification

Nutrient fluxes are the driving forces for lake metabolism and as such, are a prerequisite for studies on eutrophication, acid rain or contaminant problems.

STUDY TITLE	Lake Restoration by Hypolimnetic Aeration	DIV OR ORG AED
KEY WORDS	PHOSPHORUS, NITROGEN, EUTROPHICATION, METHANE	SEC'N OR GRP NUPROS
STUDY LEADER	Lean, D.R.S.	TEL: 637-4589 PAE 1714
TEAM MEMBERS	S. Rao, K. Edmondson. In collaboration with Dr. D. McQueen, (Grad students - 4 and technicians - 4), York University	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. The influence of hypolimnetic aeration on the cycling of nitrogen and phosphorus will be investigated. This includes the influence of increased oxygen levels on processes of denitrification, nitrification and internal loading of nutrients from the sediments. Changes in the production of methane and hydrogen sulphide will be assessed.
2. Experiments on efficiency of aeration have been conducted by the research team over short intervals but the influence of long-term aeration on the water chemistry and lake biota is planned for next year.
3. Samples for water quality analysis (WQB) to be collected and samples collected and enumerated for phytoplankton, zooplankton, and fish. Samples for N₂O and methane analysis to be sent to Knowles (McDonald College).

Performance Indicators

1. Paper on the influence on bacteria numbers to be published March 1984. Paper on design and efficiency of aeration to be published along with an additional paper on preliminary experiments on mechanism of restoration (prior to March 1984).
2. Experiments to begin in May with data processing to continue throughout the field year, October 1984.
3. Data collection completed by March 1984.

Justification

Many lakes have deteriorated so that algal blooms persist throughout the summer. Hypolimnetic aeration offers a chance for rehabilitation but in the past, other attempts often ended in failure without knowing why. This investigation specifically deals with the mechanism of improvement which results from alteration of the transformation of nitrogen and phosphorus.

STUDY TITLE	Lake Acidification and Sediment Trace Metal Release in Macrophytes Lakes	DIV OR ORG AED
KEY WORDS	LRTAP, ACID LAKES, TRACE METALS, SEDIMENTS, ZINC, NICKEL, GEOCHEMISTRY, AQUATIC MACROPHYTES	SEC'N OR GRP AQWEED
STUDY LEADER	Carignan, R.	TEL: 637-4602 PAE 1742
TEAM MEMBERS	J.O. Nriagu	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Water Research: General	

Goals

To establish the relationships between sediment pH, trace metal release and sediment buffering capacity in the LRTAP study lakes in Ontario and Quebec and lakes in Algonquin Park. Combined with the lakes sampled in 82/83, a broad spectrum of sediment types will have been sampled which could then support the development of a model that would predict trace metal release under a wide variety of sediment conditions. Such a model would be valuable for managers who attempt to predict the impact of acidic precipitation on lakes across Canada.

Performance Indicators

Report of progress to date by March 1984.

Justification

Lakes receiving acidic precipitation have been observed to have a large reservoir of pollutant metals in their sediments. Isotope studies conducted at ELS have shown significant releases of Aluminum, Manganese, Iron and Zinc from acidified sediments. Certainly, Aluminum concentrations in acidic lakes are the most important environmental parameter that determines if fish will survive. And yet, internal loading of metals such as Aluminum has been virtually ignored by the scientific community.

STUDY TITLE	Contaminant Content of Aquatic Macrophytes in a Contaminated Stream	DIV OR ORG AED
KEY WORDS	TOXIC SUBSTANCES, ALGAE, AQUATIC MACROPHYTES, CANAGAGIGUE CREEK	SEC'N OR GRP AQWEED
STUDY LEADER	Painter, S.	TEL: 637-4251 PAE 1742
TEAM MEMBERS	J. Wood and J. Carey	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Water Research: General	

Goals

This project will measure the biomass of aquatic macrophytes in the Canagagigue Creek so that the content of contaminants trapped in the tissue can be estimated. This project is in cooperation with ECD.

Performance Indicators

Report to J. Carey by March 84.

Justification

The study is part of an ongoing study within ECD on the fate and impact of toxic contaminants in the environment.

STUDY TITLE	Control of Eurasian Watermilfoil	DIV OR ORG AED
KEY WORDS	EURASIAN MILFOIL, HERBICIDES, 2,4-D, MACROPHYTES	SEC'N OR GRP AQWEED
STUDY LEADER	Painter, S.	PAE 1742
TEAM MEMBERS	J. Wood	DATE 82/12/31
ECS PROGRAM	Water Management Reserach	
ACTIV ELEM	Water Research: General	

Goals

To develop ecologically sound control technologies for the control of Eurasian watermilfoil.

To evaluate the ecological impact of current control technologies.

Experiment 1: To demonstrate that harvesting has a long term impact on milfoil growth, a contract will be initiated to demonstrate the long term impact of harvesting in Quebec. We will continue our harvesting in Buckhorn.

Experiment 2: Phytoplankton blooms as a result of nutrient release from herbicide killed plants does not always occur. It is postulated that the sediment is acting as a sink for nutrients. Different sediments would behave differently. This phenomenon would be demonstrated.

Performance Indicators

1. Preliminary report March 84.
2. Summary report by March 84.

Justification

Eurasian watermilfoil is a nuisance aquatic plant infesting many areas in Ontario, Quebec and B.C. Lost tourist revenue and depreciation of land values due to decreased recreational appeal for these recreational areas is in the order of tens of millions of dollars.

STUDY TITLE	Aquatic Macrophytes and Acid Rain	DIV OR ORG AED
KEY WORDS	ACID LAKES, AQUATIC MACROPHYTES, TRACE METALS, ZINC, NICKEL	SEC'N OR GRP AQWEED
STUDY LEADER	Painter, S.	TEL: 637-4251 PAE 1742
TEAM MEMBERS	J. Wood V. Glooschenko (OMNR)	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Water Research: General	

Goals

Aquatic macrophytes are extremely abundant in acid lakes and have been shown to result in the release of trace metals from littoral sediments under acidic conditions. However, the environmental significance of such a phenomena has not been demonstrated. This study will conclude 82-478.

1. The littoral zones and open waters of several lakes will be sampled to determine if the littoral zones have significantly higher concentrations of metals than the open water. The lakes will be selected in conjunction with the Lands Directorate with the following criteria in mind: 1) the pH of the lakes will be between 4-7; and 2) the lakes will be important for waterfowl grazing.
2. The lakes will be sampled intensively during one week of the summer. The pH and trace metal content of the littoral and open water will be measured. Plant samples will be collected for metal analysis for interpretation in waterfowl feeding experiments undertaken elsewhere.

Performance Indicators

1. Select the lakes by June 83.
2. Collect and analyze samples Nov. 83.
Prepare report by March 84.

Justification

The most sensitive part of the life cycle of almost all aquatic organisms including fish and waterfowl is spent in the littoral zones. Acid lakes become toxic to fish because of an elevation in Aluminum concentrations. However, most limnological studies concentrate on sampling the open water. The present study will investigate the metal levels typical in acid and neutral lakes to illustrate that a major readjustment of water sampling programs is necessary.

STUDY TITLE	Cladophora in the Great Lakes	DIV OR ORG AED
KEY WORDS	ALGAE, SURVEILLANCE, GREAT LAKES, L. ONTARIO, ALGAL GROWTH, NEARSHORE, BOTTOM SUBSTRATES	SEC'N OR GRP AQWEED
STUDY LEADER	Painter, S.	TEL: 637-4251 PAE 1742
TEAM MEMBERS	M. Charlton	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Water Research: General	

Goals

The Cladophora research will concentrate on the Cladophora problem in Lake Ontario and attempt to determine the present nutrient status of the alga and whether phosphorus controls could significantly reduce biomass. The project will proceed logically in the following order:

1. Survey 1972 IFYGL stations during 1983 to provide extremely valuable comparison data. This data will show if the Cladophora biomass was on the decline and whether tissue phosphorus had decreased. The data would then be available for a comparison in another ten years.
2. Cladophora biomass prediction using available data base - the available data on nearshore water quality will be organized. If insufficient data are available for the prediction of Cladophora biomass for the Canadian Lake Ontario shoreline then the gaps will be identified. If sufficient data are available then the biomass will be predicted.
3. Estimation of Cladophora biomass using artificial substrates. The largest problem plaguing research on Cladophora is the inability to sample biomass on natural substrates with any confidence. Last year different artificial substrates were tested. Now the best substrate will be field tested as part of a larger study to model the growth of Cladophora near Oakville.

Performance Indicators

1. Contract completed by February 84.
2. Model by January 84.
3. Contract completed by February 84.

Justification

Cladophora is a well known aesthetic problem of shorelines. The public perception of lake water quality centers on Cladophora. Therefore, it is essential to know whether the Cladophora problem will be ameliorated by current control measures.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

No: 83- 490

STUDY TITLE	Calcite Precipitation Effect on Phosphate in L. Ontario Thermal Bar	DIV OR ORG AED
KEY WORDS	PHOSPHATE AVAILABILITY, FIBRILS, EUTROPHICATION	SEC'N OR GRP NUPROS
STUDY LEADER	Murphy, T.	TEL: 637-4221 PAE 1714
TEAM MEMBERS	G. Leppard, D. Paolini	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. To study the effect of colloidal and dissolved organic materials, temperature and algal productivity on calcite precipitation.
2. Use a CO_2 extraction to distinguish biological P uptake from P adsorption to calcite.

Performance Indicators

1. Report 1984.
2. Report 1984.

Justification

Calcite precipitation has often been observed in Lake Ontario and phosphate could be precipitated with calcite from the photic zone. The thermal bar area often contains higher concentrations of phosphate; thus, if this reaction occurs in Lake Ontario it could be found in the thermal bar. A preliminary experiment in 1982 suggested that phosphate was precipitating with calcite.

STUDY TITLE	Taste and Odor Problem in Drinking Water from L. Ont.	DIV OR ORG AED
KEY WORDS	ALGAE, WATER QUALITY, GREAT LAKES	SEC'N OR GRP AQWEED
STUDY LEADER	Painter, S.	TEL: 637-4251 PAE 1714
TEAM MEMBERS	B. Brownlee, K. Burnison,	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

It is hypothesised that the taste and odor problem in Burlington is due to Cladophora collecting and rotting near the intake pipe of the filtration plant. Therefore two approaches will be pursued.

- 1) Cladophora and Oscillatoria cultures will be established and then allowed to rot. The breakdown products will be characterized by GC and HPLC. Water samples will then be obtained during the taste and odour period and compared to the algae breakdown products.
- 2) Diver inspections of the intake pipe and the vicinity will be performed as well as an inspection of the bottom of L. Ontario to a depth of 30 metres with collection of sediment samples to determine if a widespread blue-green algae mat occurs at the bottom sediments.

Performance Indicators

Culture studies completed by Aug. Analytical analysis completed by Nov. Report by March.

Justification

Cladophora is a well known aesthetic problem of shorelines. The public perception of lake water quality centers on Cladophora. Taste and odor problems in the drinking water supply further reinforce public attitude about poor water quality with little action from the governments to correct the problems.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-492

STUDY TITLE	Arsenic and Selenium Pollution of the Great Lakes	DIV OR ORG AED
KEY WORDS	ARSENIC POLLUTION, SELENIUM POLLUTION, GREAT LAKES, GEOCHEMICAL CYCLES	SEC'N OR GRP EMPACS
STUDY LEADER	Nriagu, J.O.	TEL: 637-4252 PAE 1714
TEAM MEMBERS	Y.K. Soon, R. D. Coker	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Critical survey of the available data on the distribution of As and Se in the Great Lakes.
2. Obtain water, suspended particulate and sediment samples from Lakes Erie and Ontario in spring and late summer.
3. Determine the total As and the S^{V_2} and Se^{V_4} concentrations in the water samples.
4. Develop a fractionation scheme for As and Se in the sediments and suspended particulates.

Performance Indicators

1. Summary report on the available data to be completed by January 1984.
2. Samples from 10-12 stations per lake per cruise to be processed on board as necessary.
3. Analyses of water samples to be completed by February 1984, and a paper prepared by March 1984.
4. Methodology development to be completed and processing of samples started by March 1984.

Justification

Arsenic is a priority contaminant in the Great lakes; the potential adverse effects of Se have yet to be rated.

NATIONAL WATER RESEARCH INSTITUTE

Study PlanGLWQA
NO: 83-493

STUDY TITLE	Productivity and Phosphorus Limitation in Lake Superior Phytoplankton.	DIV OR ORG AED
KEY WORDS	ALGAL GROWTH, PHOSPHORUS, LAKE SUPERIOR, EUTROPHICATION	SEC'N OR GRP GRLICS
STUDY LEADER	Charlton, M.N.	TEL: 637-4589 PAE 1714
TEAM MEMBERS	D.R.S. Lean, A. Abbott, I. Gray, L. Nalewajko (U of T), R. Cuhol (U of Miami)	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. One week continuous experiment onboard Limnos in July or August 1983 on Lake Superior.
2. Measurement of primary production by 3 methods and comparison of this with estimates of phosphorus uptake and protein synthesis.
3. Analysis of phosphorus limitation of algal biomass and productivity.

Performance Indicators

1. Completion of field work by Aug 83.
2. Completeion of reports by Mar 84.

Justification

This experiment coincides with surveillance work which is conducted infrequently on Lake Superior. The work is designed to investigate discrepancies between productivity methods, trends in algal metabolism and to answer the recently raised question of whether the algae are phosphorus limited.

STUDY TITLE	Lake Ontario Nutrient Assessment Study (LONAS)	DIV OR ORG AED
KEY WORDS	ALGAL NUTRITION, PHOTOSYNTHESIS, RESPIRATION, SEDIMENTATION, PROTEIN SYNTHESIS	SEC'N OR GRP NUPROS
STUDY LEADER	Lean, D.R.S.	TEL: 637-4589 PAE 1714
TEAM MEMBERS	A. Abbott, K. Edmondson, I. Gray, M.N. Charlton	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

Several physiological and chemical indices for estimating nutrient limitation were used to establish the time when the biomass of plankton in Lake Ontario was limited by phosphorus and nitrogen compared with physical processes. This will be summarized so that existing nutrient management strategies can be revised.

Performance Indicators

1. Sample analysis and biomass enumeration over half complete at this time but work will continue through 1983.
2. Data analysis in 1983.
3. Preparation of preliminary report and publications - March 1983.
4. Developing relationship between the community structure and the nutrient regime. Preliminary report by March 1983 plus 8 publications by March 1984. Final report and model by mid 1985.

Justification

This study is designed to determine the duration and degree of nutrient limitation of algae in Lake Ontario and to estimate its effect on overall water quality and assess its implication on P management strategies. This involves relating the nutrient data collected during the intensive monitorings of Lake Ontario to physiological indicators of nutrient limitation. Nutrient analysis and biomass estimates will also be made along with selected rate constants to integrate with the study of physical processes.

STUDY TITLE	Sediment Bank - Great Lakes	DIV OR ORG AED
KEY WORDS	SEDIMENTS, GREAT LAKES, TRENDS, CONTAMINANTS	SEC'N OR GRP EMPACS
STUDY LEADER	Bourbonniere, R.A.	TEL: 637-4382 PAE 1714
TEAM MEMBERS	T. Mayer, D. Liu	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

To establish a bank of Great Lakes sediment samples to permit retroactive analysis in order to establish spatial and temporal trends.

1. Collect about 1kg(dry wt.) of surficial sediments from each of about 50 locations in L. Superior.
2. Collect sediments representing the past 100 years at 3-5 stations in Lake Superior.
3. Determine transient parameters at time of sampling.
4. Support L. Superior surveillance requirements for sediments.
5. Continue preservation study.
6. Process all sediments collected for long-term storage.
7. Determine bulk parameters in bulk samples.
8. Update catalogue for L. Ontario and L. Erie samples.

Performance Indicators

1. Cruise: July 83.
2. Cruise: July 83.
3. Cruise: July 83.
4. Cruise: July 83
5. Sept. 83.
6. Begin after cruise, complete by March 84
7. Begin Jan. 84; complete March 84.
8. Complete by March 84.

Justification

Sediments act as the ultimate sink of many persistent contaminants, both organic and inorganic. In this respect, they record contamination events. A bank of Great Lakes sediments will serve as (1) a source of baseline material from which to reference future contamination problems, (2) an integral part of any early warning system and (3) an aid to the understanding of trends in contaminant loadings. The sediment bank fulfills, in part, requirements under Annex 12, Sections 4(a) and 5(e) of the GLWQA. This study is a continuing one and concentrates on a different one of the Great Lakes each year.

STUDY TITLE	Lake Erie Surveillance Continuity	DIV OR ORG AED
KEY WORDS	LAKE ERIE, OXYGEN, THERMOCLINE, WATER QUALITY, PROFILING SYSTEM	SEC'N OR GRP GRLICS
STUDY LEADER	Charlton, M.N.	TEL: 637-4589 PAE 1714
TEAM MEMBERS	J. Ford (Eng), H. Shear (GLFRB)	DATE 82/12/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Ecology	

Goals

1. Continue and complete development of oxygen profiling system begun in 82/83.
2. Deploy oxygen profiling system during biweekly "BIOINDEX" surveys on Lake Ontario and Lake Erie, June 1 - September 30, 1983.
3. Record and display oxygen profiles showing details of stratification and oxygen depletion in hypolimnia and thermoclines.
4. Analyze and interpret oxygen depletion in the thermocline and hypolimnion regions.
5. Use the in situ measurements to examine the performance of water samplers.

Performance Indicators

1. Completion and deployment of oxygen profiling system, June 1983.
2. Report on summer O₂ profiles with interpretation of anomalies in the thermocline zone, March 1984.
3. Report on performance of water sampler relative to in situ measurements, March 1984.

Justification

This project will provide accurate profiles which are not usually obtained. These are needed to study the reaeration of the hypolimnion and to determine the importance of decomposition in the thermocline as an indicator of eutrophication in the Great Lakes.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-498

STUDY TITLE	Cladophora Abundance in L. Ontario and Nearshore Aesthetics	DIV OR ORG AED
KEY WORDS	ALGAE, GREAT LAKES, PHOSPHORUS, L. ONTARIO ALGAL GROWTH	SEC'N OR GRP GRLICS
STUDY LEADER	Charlton, M.	TEL: 637-4589
TEAM MEMBERS	S. Painter, J. Wood, W. Booth	PAE 1714
ECS PROGRAM	Water Management Research	DATE 82/12/31
ACTIV ELEM	Aquatic Ecology	

To determine the relative importance of upwelling phenomena and onshore nutrient sources for the growth of Cladophora at, for example, Oakville Creek, L. Ontario.

1. Conduct initial field inspection to determine optimum sites.
2. Identify upwelling events and the extent to which these events modify ambient phosphorus concentrations.

Performance Indicators

1. a) Construct 6 solid state temperature loggers for deployment at three sites, April 1 - Nov.
 b) Sample 3 sites weekly for temperature, phosphorus fractions, light extinction, tissue phosphorus, Cladophora biomass April 1 - Nov.
2. a) Tabulate physical and chemical data for use in Cladophora Nov. 1 to March 1.
 b) Report on progress March 31.

Justification

Cladophora is a well known aesthetic problem of shorelines. The public perception of lake water quality centers on Cladophora. Therefore, it is essential to know whether the Cladophora problem will be ameliorated by current control measures.

AQUATIC PHYSICS & SYSTEMS DIVISION

STUDIES FOR AQUATIC PHYSICS AND SYSTEMS DIVISION

STUDY LEADER 83/06/15.

SECTION	SECTION	STUDY TITLE
DIVISION	500	AQUATIC PHYSICS AND SYSTEMS DIVISION-ADMINISTRATION
	593	COORDINATION OF IED) LRTAP PROGRAM

DATA MANAGEMENT

- 571 CCIW DATA ARCHIVING
- 572 WATER QUALITY DATA BASE ADMINISTRATION
- 573 NWRI BRANCH RESEARCH SUPPORT - DATA MANAGEMENT
- 574 NON-NWRI BRANCH RESEARCH SUPPORT - DATA MANAGEMENT
- 575 GEMS/UNEP - GLOBAL WATER QUALITY DATA MANAGEMENT
- 576 MINI/MICRO APPLICATIONS FOR CCIW

ENVIRONMENTAL SPECTRO-OPTICS 540 APPLICATIONS OF OPTICAL MEASUREMENTS TO LAKE RESEARCH

ENVIRONMENTAL SIMULATION

- 501 OPERATIONAL WATER QUALITY AND CONTAMINANT TRANSPORT MODELS
- 502 STRATIFICATION AND AIR-SEA INTERACTION
- 503 COASTAL EXCHANGE DYNAMICS
- 504 FATE OF ORGANIC CONTAMINANTS IN THE AQUATIC ENVIRONMENT
- 505 ENVIRONMENTAL SIMULATION/STATISTICAL ANALYSIS
- 507 AQUATIC REGIME ACIDIFICATION MODELS
- 502 AQUATIC REGIME ACIDIFICATION MODELS AND MONITORING

PHYSICAL LIMNOLOGY

- 504 COASTAL TRANSPORT MODELS
- 503 VERTICALLY PROFILING AND BOTTOM MOUNTED CURRENT METERS
- 509 WATER MOVEMENTS IN THE CENTRAL BASIN OF LAKE ERIE
- 510 LAKE ONTARIO PHYSICAL LIMNOLOGY STUDIES
- 512 GREAT LAKES CLIMATIC ATLAS (VOLUME 2)
- 513 PHYSICAL LIMNOLOGY STUDY OF A YUKON BASIN LAKE
- 515 ANALYSIS AND INTERPRETATION OF LAGRANGIAN DROGUE DATA
- 516 POLLUTANT TRANSPORT THROUGH POROUS-MEDIA AND SURFACE-WATER INTERFACES

NAGEL, W.

- DUFFIELD, R.
- COMBA, H.
- COMBA, H.
- ROGALSKY, J.
- ROGALSKY, J.

BUKATA, R. P.

- LAM, D. C. L.
- SIMONS, T. J.
- SIMONS, T. J.
- HALFON, E.
- EL-SHAARAWI, A. H.
- LAM, D. C. L.
- THOMPSON, M. E.

- MURTHY, C. R.
- BOYCE, F. M.
- BOYCE, F. M.
- MURTHY, C. R.
- BOYCE, F. M.
- HAMBLIN, P. F.
- MURTHY, C. R.
- LAM, D. C. L.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan**NO: 83-500**

STUDY TITLE	Aquatic Physics and Systems Division Administration	DIV OR ORG APSD
KEY WORDS	AQUATIC PHYSICS, SYSTEMS ANALYSIS, MODELS, ADMINISTRATION	SEC'N OR GRP APSDIV
STUDY LEADER	Elder, F.C.	TEL: 637-4212 PAE 1712
TEAM MEMBERS	S.M. Tapping	DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

1. To develop the research program plan of APSD.
2. To develop a personnel utilization plan for APSD.
3. To develop a personnel training plan for APSD.
4. To develop a financial budget for APSD.
5. To manage and control the program of APSD.

PERFORMANCE INDICATORS:

1. Research program plan developed on schedule.
2. Personnel utilization plan developed within allocations and schedule.
3. Personnel training plan developed within budget and schedule.
4. Financial plan for APSD developed within allocation.
5. Program plan of APSD carried out, evaluated and reported as per the operation directives of the Institute.

JUSTIFICATION:

The APSD provides the physical limnology, environmental optics, environmental simulation and data management contributions to the NWRI program plan.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-501

STUDY TITLE	Operational Water Quality and Contaminant Transport Models	DIV OR ORG APSD
KEY WORDS	ENVIRONMENTAL SIMULATION, OPERATIONAL MODELS, CONTAMINANT TRANSPORT, WATER QUALITY MODELS, SURVEILLANCE	SEC'N OR GRP ENV SIM
STUDY LEADER	Lam, D.C.L.	TEL: 637-4235
TEAM MEMBERS	A.S. Fraser, W.J. Schertzer and T.J. Simons	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/08
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

1. To implement presently available water quality and contaminant transport models in operational modes for management applications by March 1984.
2. To review and assess these models under different proposed control strategies by March 1984.
3. To update and upgrade the models by integrating recent research results and lake surveillance data by March 1984.

PERFORMANCE INDICATORS:

- 1a) Lake Ontario Water Quality simulation model transferred to IWD-OR by Dec 1983.
- b) Coastal diffusion models reviewed for status of operational ability. Jan 1984.
2. Lake Erie Water Quality simulation model updated under control scenarios by March 1984.
3. Nitrogen cycle implemented by March 1984.

JUSTIFICATION:

The IJC has in several reports of the WQB and SAB called for improved capability to simulate the relationships between the loading of phosphorus and the ecosystem responses (see 1980 WQB report). The ECS Strategic Plan includes Water Supply (including its quality) as priority IV. Transfer of the model capability to operational modes will create a numerical management decision ability.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-502

STUDY TITLE	Stratification and Air-Sea Interaction	DIV OR ORG APSD
KEY WORDS	ENVIRONMENTAL SIMULATION, CLIMATE, AIR-WATER INTERACTION, THERMOCLINE	SEC'N OR GRP ENV SIM
STUDY LEADER	Simons, T.J.	TEL: 637-4218
TEAM MEMBERS	AES (CCC)	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/12
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

1. To improve the model of vertical mass exchange in large lakes and oceans - 1983.
2. In cooperation with AES, Climate Centre staff, couple the upper ocean model of NWRI with the atmospheric circulation model of AES - 1983.

PERFORMANCE INDICATORS:

1. A report of the revised model for vertical mass exchange is to be completed by March 1984.
2. Actively dependent upon AES progress. Evaluation of the coupled model is expected in the FY 83-84.

JUSTIFICATION:

The DOE priorities for AES indicate a #3 priority for the development and implementation of the Canadian Climate Program. The vertical mass exchange at the air water interface is a critical portion of the climate model. In addition, the same models integrate directly into the contaminant and water quality models for large lakes.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-503

STUDY TITLE	Coastal Exchange Dynamics	DIV OR ORG APSD
KEY WORDS	ENVIRONMENTAL SIMULATION, COASTAL ZONE, LAKE ONTARIO, NIAGARA RIVER	SEC'N OR GRP ENV SIM
STUDY LEADER	Simons, T.J.	TEL: 637-4218 PAE 1712
TEAM MEMBERS	W.M. Schertzer	DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

1. To develop an improved model of the hydrodynamics of the nearshore zones of large lakes with emphasis on the north shore of Lake Ontario and the Niagara River plume and of its effects on the circulation of the Western Basin of Lake Ontario.
2. To develop appropriate advanced modeling techniques for near shore dynamics - continuing.

PERFORMANCE INDICATORS:

- 1a) A report of the north shore Lake Ontario model to be written by December 1983.
- b) A Niagara River plume model to be developed by February 1984.
2. Professional scientific papers are expected.

JUSTIFICATION:

The nearshore zone is the buffer zone through which shore-release substances must enter the lake. Ability to model the open lake responses to these inputs has been identified by the IJC SAB, 1978 annual report, as a research need. Ontario Region-IWD has defined the ability to model the water quality impact of shore development as a research need.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-504

STUDY TITLE	Fate of Organic Contaminants in the Aquatic Environment	DIV OR ORG APSD
KEY WORDS	TOXIC SUBSTANCES, PREDICTION, LAKE ONTARIO, BOTTOM SEDIMENTS, BENTHOS	SEC'N OR GRP ENV SIM
STUDY LEADER	Halfon, E.	TEL: 637-4243
TEAM MEMBERS	R.A. Bourbonniere and J. Carey	PAE 4200 DATE 82/10/28
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

GOALS:

1. Niagara River Plume Study:

To develop model of the pathways of specific organic contaminants that are transported by the Niagara River plume through progressive zones and are either deposited in the sediments or transferred to the open lake far-field. Component tasks of this model are: 1. sediment system kinetics; 2. biosorption in fishes and 3. biosorption in benthos.

2. Open Lake Ontario, far-field Models

To develop models of the spatial distribution of the deposition of specific organic contaminants in the open water and bottom sediments of Lake Ontario. Component tasks of the model are: 1. to revise the Niagara River plume model to the open lake and 2. to compare the individual site model estimates with experimental data when available.

PERFORMANCE INDICATORS:

1. Preliminary Niagara River plume models are to be developed by October 1983. Interfacing of the chemical and biological models with hydro dynamic models will be carried out by March 1984.
2. Open lake far-field models will not be completed in FY 83-84. A status report to be prepared by March 1984.

JUSTIFICATION:

Toxic substances is listed as the 1st priority item of the DOE Strategic Plan and of the ECS National Priorities. The ability to model the pathway and fate of selected organic contaminants will provide an ability to generalize to other substances of similar characteristics and to other locations.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-505

STUDY TITLE	Environmental Simulation/Statistical Analysis	DIV OR ORG APSD
KEY WORDS	TREND ANALYSIS, NIAGARA RIVER, ST. LAWRENCE RIVER, pH, ALKALINITY, TKN, NO ₃	SEC'N OR GRP ENV SIM
STUDY LEADER	EI-Shaarawi, A.H.	TEL: 637-4584 PAE 1140
TEAM MEMBERS		DATE 82/10/28
ECS PROGRAM	Canada-U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI & Regional Involvements in Canada-U.S. & Interprovincial waters	

GOALS:

1. To develop a statistical model relating the seasonal cycles of Ph, TP, Alk., NO₃, for the Niagara and St. Lawrence Rivers by April 1984.
2. To test for the existence of significant trends in the Niagara and St. Lawrence River for parameters above and determine the pattern of the trend for the period 1975/81 by March 1984.
3. To propose an improved sampling strategy for the Niagara River monitoring program.

PERFORMANCE INDICATORS:

- 1a) A six month status report to be submitted indicating progress - October 1983.
2. A report on the trends of pH, TP, Alk., and NO₃ for the Niagara and St. Lawrence Rivers for the period 1975/81 - March 1984.
3. A report on an improved sampling strategy for the Niagara River - March 1984.

JUSTIFICATION:

The IWD, OR carries out an extensive surveillance program to determine the responses of the Great Lakes to control programs. The Niagara and St. Lawrence Rivers are the primary input and output of Lake Ontario. Development of a statistical analysis for material fluxes of these rivers can permit the optimization of the monitoring program and provide an objective analysis of trends that have occurred.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-506

STUDY TITLE	Coastal Transport Models	DIV OR ORG APSD
KEY WORDS	NIAGARA RIVER, LAKE ONTARIO	SEC'N OR GRP PHYS LIM
STUDY LEADER	Murthy, C.R.	TEL: 637-4235 PAE 1712
TEAM MEMBERS	D.C.L. Lam	DATE 82/10/28
ECS PROGRAM	Canada-U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI & Regional Involvement in Canada-U.S. & Interprovincial waters	

GOALS:

1. To analyze the drogue (Lagrangian) and current meter (Eulevian) data obtained during FY 82-83 in the Niagara River plume in a model framework preserving flow continuity and mass balance.
2. To develop the flow model to describe the seasonal circulation patterns related to meteorological and to topographic factors in the river mouth area.
3. To interface the transport model with the data for biochemical and toxic contaminants distributions.

PERFORMANCE INDICATORS:

1. A data report of the Niagara River current measurements from Fy 82-83 to be prepared by October 1983.
2. A model of the circulation patterns related to river plume currents to be developed by March 1984.
3. Preliminary results of interfacing the biochemical and toxic contaminants with the circulation model to be achieved by March 1984.

JUSTIFICATION:

The study is to form a proposal to GLWQP. That program gives priority to defining the processes and mechanisms of toxic contaminant transport and diffusion from the Niagara River into Lake Ontario.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-507

STUDY TITLE	Aquatic Regime Acidification Models	DIV OR ORG APSD
KEY WORDS	ACID RAIN, ENVIRONMENTAL SIMULATION, LRTAP	SEC'N OR GRP ENV SIM
STUDY LEADER	Lam, D.C.L.	TEL: 637-4235 PAE 4300
TEAM MEMBERS	A.G. Bobba, D. Jeffries, M. Thompson, F.C. Elder, and W.M. Schertzer	DATE 82/10/28
ECS PROGRAM	M.R.C. - LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

GOALS:

1. To integrate watershed data to define the pathways leading to surface or groundwater systems and to calibrate known chemical equilibrium equations in the aquatic regimes, particularly on the carbon and sulphur cycles (by March, 1984).
2. To continue development of hydro-geochemical acidification and water quality model components affecting the pH, alkalinity and major ions; inclusion of atmospheric loads and rainfall-runoff submodels; feedbacks to experimental projects.

PERFORMANCE INDICATORS:

1. Progress towards definition of the acidification model to be reported by October 1984.
2. A report of the watershed acidification model including atmospheric loading to be completed by March 1984.

JUSTIFICATION:

The primary requirement of the Canada-U.S. Memorandum of Intent concerning Transboundary Air Pollution is the specification of ecosystem tolerance and response to LRTAP stresses. The modelling efforts are necessary to synthesize the information into comprehensive regime response simulation.

STUDY TITLE	Vertically Profiling and Bottom Mounted Current Meters	DIV OR ORG APSD
KEY WORDS	PHYSICAL LIMNOLOGY, INSTRUMENTATION, GREAT LAKES, MIXING	SEC'N OR GRP PHYS LIM
STUDY LEADER	Boyce, F.M.	TEL: 637-4277
TEAM MEMBERS	F. Roy (ESS) and J. Bull	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/28
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

- 1a) GVAPS - to consult with Engineers and Tech Ops on improvements to the seaworthiness of the system. To interface with non-physical scientists concerning the use of the vehicle to carry DO sensors etc. and to integrate these requirements into system specifications.
- b) To plan for and to assist with the field test of the system in the late fall of 1983.
- c) To evaluate the results of the field test.
- d) To write a systems manual and final report.
- 2a) CATS - to provide system specifications to Engineers based on study of current design now in use. To consult with engineers and other scientists during the design and construction phase.
- b) To plan for and to assist with the field test of the system in the late fall of 1983.
- c) To evaluate the results of the field test.
- d) To write a system manual and final report.

PERFORMANCE INDICATORS:

- 1a) GVAPS specifications completed by August 1983.
- b) Field tests of GVAPS completed by October 1983.
- c) GVAPS field tests report completed by January 1984.
- d) GVAPS systems manual and final report by March 1984.
- 2a) CATS specifications completed by July 1983.
- b) CATS field tests completed by October 1983.
- c) CATS field tests results report by January 1984.
- d) CATS system manual and final report by March 1984.

JUSTIFICATION:

Both the GVAPS and the CATS are designed to extend knowledge of the vertical distribution of horizontal currents through the water column from the surface to the bottom. This information is needed in order to improve the parameterizations of turbulent fluxes of momentum (stress) used in numerical-hydrodynamical models. The GVAPS system has wide applicability because of its capacity to carry additional biochemical sensors. The CATS provides information on currents in shallow, nearshore water.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-509

STUDY TITLE	Water Movements in the Central Basin of Lake Erie	DIV OR ORG APSD
KEY WORDS	PHYSICAL LIMNOLOGY, LAKE ERIE	SEC'N OR GRP PHYS LIM
STUDY LEADER	Boyce, F.M.	TEL: 637-4277
TEAM MEMBERS	P. Hamblin, C.R. Murthy, D. Lam, M. Charlton, J. Bull, D. Robertson, F. Chiocchio, K. Miners, M. Kerman,	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/28
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

To complete major analyses of experimental work undertaken in Lake Erie during 1979 and 1980 to publish a synthesis of principal results and recommendations.

PERFORMANCE INDICATORS:

1. Complete major studies where results are required for the general synthesis.
2. Complete synthesis report begun in previous fiscal year. Publication by June 1983.
3. Continue analyses of special experiments, such as Short internal waves in mid-basin of Lake Erie and prepare a report by March 1984.

JUSTIFICATION:

Biochemical processes (such as oxygen depletion) in Lake Erie are strongly influenced by physical processes such as entrainment, mixing, resuspension of sediments. Documentation/quantification of these processes as they affect water quality is essential to sound management policy based on a knowledge of the natural, physically-induced variability of the system. Knowledge derived from these studies will assist in NWRI systems simulation of Lake Erie response to contaminant loadings.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-510

STUDY TITLE	Lake Ontario Physical Limnology Studies	DIV OR ORG APSD
KEY WORDS	LAKE ONTARIO, NIAGARA RIVER, PHYSICAL LIMNOLOGY, COASTAL ZONE	SEC'N OR GRP PHYS LIM
STUDY LEADER	Murthy, C.R.	TEL: 637-4235
TEAM MEMBERS	J. Bull, K.C. Miners, F. Chiocchio, D.G. Robertson, and M. Kerman	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/28
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

To provide data bases on the extent to which the local physical processes of the nearshore zone are affected by lake-wide processes and large scale forcing. Specifically: (a) to relate nearshore current reversals to alongshore propagation of topographic and baroclinic wave phenomena; (b) to analyze cross-shore variations of currents in terms of unusual modes of oscillations and effects of drift and diffusion in shallow water; (c) to determine the relative effects of small scale mixing and large scale upwelling on the nearshore thermal regime; (d) to study the impact of mass exchanges between the nearshore zone and open lake on seasonal variations of water quality parameters in the nearshore zone.

PERFORMANCE INDICATORS:

- a) Complete data bases for all of the instrumentation systems used in Lake Ontario 1982/83 experiments to be compiled - March 1984.
- b) Climatological and statistical summaries of currents, meteorological and FTP data base for 1982/83 Lake Ontario study (two reports one for summer and one for winter period are planned).
- c) Climatological and statistical data reports for the two intensive periods (special systems data base) - to be prepared.

JUSTIFICATION:

Coastal zones are the areas of most immediate interest and concern to managers and thus the need for research on physical processes and water quality properties of these zones. Such information is vital to the solution of practical problems such as environmental impact of energy development on the northshore of Lake Ontario and of the influence of Niagara River on the Lake Ontario western basin.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-512

STUDY TITLE	Great Lakes Climatic Atlas (Volume 2)	DIV OR ORG APSD
KEY WORDS	ATLAS, CLIMATE, GREAT LAKES, CURRENTS, TEMPERATURE	SEC'N OR GRP PHYS LIM
STUDY LEADER	Boyce, F.M.	TEL: 637-4277 PAE 1712
TEAM MEMBERS	D.G. Robertson	DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

To prepare Volume 2 of the Great Lakes Climatic Atlas which will contain climatological/statistical summaries of Great Lakes currents and temperatures (AES/CCC will produce Volume 1 summarizing meteorological parameters). This study plan covers the second of a two-year effort.

PERFORMANCE INDICATORS:

1. From software developed in the previous year, produce maps, charts and tables, to be completed by December 1983.
2. Write supporting text by February 1984.
3. Publish Volume 2 of Atlas - to be in manuscript form by March 1984.

JUSTIFICATION:

There is a growing number of requests for information on winds, waves and currents in the Great Lakes from sailors, yachtsmen, fishermen and occasionally from police officers searching for missing persons or boats. Many of these requests could be filled with a document which gave a climatological/statistical summary of conditions in the Lakes. The combined CCC/NWRI data base provides ample information for such a summary.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-513

STUDY TITLE	Physical Limnology Study of a Yukon Basin Lake	DIV OR ORG APSD
KEY WORDS	ENVIRONMENTAL SIMULATION; CURRENTS; CURRENT METER; WATER QUALITY	SEC'N OR GRP PHYS LIM
STUDY LEADER	Hamblin, P.F.	TEL: 637-4277 PAE 1712
TEAM MEMBERS		DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

To gain understanding of the processes affecting the distribution of temperature, total dissolved solids and turbidity in ice covered riverine lakes. A long term dynamic simulation model of the two water quality parameters will be extended to include turbidity and further testing in ice covered lakes.

PERFORMANCE INDICATORS:

1. Extension of existing water quality model (DYRESM) to simulation of turbidity and test on an existing data set (Kamloops Lake) and new field data from Lake Laberge to be completed and reported on by December 1983.
2. Laboratory testing of modified current meter profiler and field measurements, field deployment and during a portion of the ice covered period in Lake Laberge, Yukon.

Laboratory testing and equipment modification are to be completed by December 1983. Field measurements in Lake Laberge are to be carried out during February 1984.

JUSTIFICATION:

Establishing the ecological sensitivity of northern lakes and reservoirs to resource development is identified as a national priority (i.e. ECS Strategic Plan (1982/87) "begin research into impacts of major water diversions and the impacts of hydroelectric development in northern areas"). Knowledge gained may be applied to other lake-river systems. This study relates to the NWRI, Pacific and Yukon Region program.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-515

STUDY TITLE	Analysis and Interpretation of Lagrangian Drogue Data	DIV OR ORG APSD
KEY WORDS	LAGRANGIAN, GREAT LAKES, CURRENTS	SEC'N OR GRP PHYS LIM
STUDY LEADER	Murthy, C.R.	TEL: 637-4235 PAE 1712
TEAM MEMBERS	K.C. Miners	DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

Lagrangian drogue data obtained during previous programs on Georgian Bay (1976) and Lake Erie (1979 and 1980) will be analysed to delineate the Lagrangian flow properties with a view to parameterize large scale horizontal turbulent exchange processes. This analysis is a direct contribution to numerical-hydrodynamical models of large lakes.

PERFORMANCE INDICATORS:

1. Data reduction and analysis of Lagrangian drogue experiments to be completed by October 1983.
2. Calculation of Lagrangian flow characteristics from SUNY Program Package completed by January 1984.
3. Preparation of a comprehensive report to be completed by March 1984.

JUSTIFICATION:

Parameterization of Lagrangian flow and horizontal turbulence exchange processes is fundamental to the development of numerical-hydrodynamical models of the coastal zones of the Great Lakes.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-516

STUDY TITLE	Pollutant Transport through Porous-Media and Surface-Water Interfaces	DIV OR ORG APSD
KEY WORDS	ENVIRONMENTAL SIMULATION, GROUNDWATER, RADIOACTIVITY, CONTAMINANT TRANSPORT	SEC'N OR GRP PHYS LIM
STUDY LEADER	Lam, D.C.L.	TEL: 637-4235 PAE 4200
TEAM MEMBERS	A.G. Bobba and R. Durham (ECD)	DATE 82/10/28
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Aquatic Physics and Systems	

GOALS:

1. To upgrade and improve the reality of the model of transport of radionuclides through the subsurface strata into Lake Ontario at the Port Granby disposal site.
2. To simulate the interaction or transfer of contaminant materials through the near-shore sediment-water interface.
This study is closely related to ECD Study 241, Radium-226 Pathways and depends upon the experimental field results of that study. There are no field measurements undertaken under this study.

PERFORMANCE INDICATORS:

1. A report of the status of the upgraded model as related to the Port Granby measurements to be completed by October 1983.
2. A report of the generalized model of contaminant transfer through a sediment-water interface to be completed by March 1984.

JUSTIFICATION:

The Great Lakes Water Quality agreement, Annex 12, Sec. 7, "Research should be intensified to determine the pathways, fate and effects of toxic substances of the Great Lakes Basin ecosystem". Models of the pathway transfer of radionuclides and other contaminants are essential to permit generalization from the experimental data at a particular site.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-540

STUDY TITLE	Applications of Optical Measurements to Lake Research	DIV OR ORG APSD
KEY WORDS	OPTICS, LAKE WATER, MODELS, SATELLITES	SEC'N OR GRP ENV OPTIC
STUDY LEADER	Bukata, R.P.	TEL: 637-4670
TEAM MEMBERS	J.H. Jerome and J.E. Bruton	PAE 1712
ECS PROGRAM	Water Management Research	DATE 82/10/28
ACTIV ELEM	Aquatic Physics	

GOALS:

1. To prepare a summary report of the optical properties of the waters of the Great Lakes using data collected in past CCIW programs.
2. To prepare a report assessing the potential for utilization of satellite technology in the pre-planning stage of inland water programs.
3. To carry out Shipborne Reflectance Radiometer measurements as part of the Lake Superior surveillance and to further develop the relationships between water quality and spectral reflectance.
4. To carry out analysis of satellite imagery of the Niagara River plume (dynamics) and of selected Ontario lakes (acidity).

PERFORMANCE INDICATORS:

1. The summary report to be completed by March 1984.
2. The report of the satellite technology utilization is to be completed by January 1984.
- 3a) Methodology for relating water quality to spectral reflectance to be reported by August 1983.
- b) Field measurements in Lake Superior to be carried out prior to November 1983.
4. Analysis of satellite imagery to be completed by January 1984.

JUSTIFICATION:

The transparency and colour of waters have been traditional indicators of water quality. The massive availability of satellite imagery offers the possibility of rapid wide scale assessment of waters in Canada if the quantitative relationships can be better established. These requirements are recognized in GLWQA Annex 11, Surveillance and Monitoring and have been proposed as applicable to the LRTAP determination of lake acidity.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-571

STUDY TITLE	CCIW Data Archiving	DIV OR ORG APSD
KEY WORDS	GREAT LAKES SURVEILLANCE, DATA MANAGEMENT, DATA HISTORICAL	SEC'N OR GRP DATAM
STUDY LEADER	Nagel, W.	TEL: 637-4536 PAE 1140
TEAM MEMBERS	J. Byron, J. McAvella, J. Rogalsky and R. Duffield	DATE 82/10/08
ECS PROGRAM	Canadian-U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI and Regional Involvement in Canada/U.S. and Interprovincial Waters	

GOALS:

1. Provide scientific data gathering, reduction, transcription and editing services for the Great Lakes Surveillance program, a solar radiation network and a toxic contaminants measurement program.
2. Provide archiving facilities and services for all scientific data gathered at NWRI and assist in data collection and reduction requirement reviews.
3. Provide for data security.
4. Provide data documentation and reference systems and retrieval assistance or services.

PERFORMANCE INDICATORS:

1. Coordination and liaison will be maintained between sample acquisition and analytical service agencies to ensure complete, timely and accurate data input to systems. Analog data will be reduced and transcribed to digital scientific units. Data will be converted to processable media, followed by quality control and editing using batch and on-line computer methods.
2. Edited data will be added to machine processible media and source records will be archived and catalogued to standard procedures while maintaining access to data bases at all times.
3. Data will be protected against loss or modification by microfilming or microfiching and back up tape file storage in fireproof vaults.
4. Data are documented as to discrepancies, anomalies and history. Users are guided in defining and obtaining data sets relevant to their projects. Data are retrieved using relevant selection criteria, and supplied on various media to authorized agencies or personnel. Generalized programs are run to produce a variety of standard and custom designed data statistics and displays.

JUSTIFICATION:

Water quality data are required for problem analysis, interpretation of environmental dynamics, reporting ambient conditions, establishing trends, making projections and international exchange on a reliable and timely basis.

STUDY TITLE	Water Quality Data Base Administration	DIV OR ORG APSD
KEY WORDS	DATA MANAGEMENT, EDP CONSULTATION, SYSTEMS ANALYSIS	SEC'N OR GRP DATAM
STUDY LEADER	Duffield, R.	TEL: 637-4324
TEAM MEMBERS	J. Rogalsky, A. Zingaro and W. Nagel	PAE 1716
ECS PROGRAM	Water Management Research	DATE 82/10/25
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

GOALS:

1. Facilitate data analysis and interpretation of water quality data.
2. Provide for operational accessibility to current and historical data acquired by the Centre.
3. Provide for the security of data bases.
4. Install and maintain the current version of S2K.
5. Acquire and manage new data bases in support of federally mandated programs.
6. Provide for the orderly development of management strategies for environmental data.

Performance Indicators:

1. The data base systems should provide standard programs to facilitate data analysis.
2. a) Prepare appropriately documented operational or policy proposals for the data bases.
b) Prepare documentation related to the STAR data base including microfiching for publication.
3. Damaged data bases will be restored to operational status within 48 hours by regeneration from archival backups of the data.
4. Install, test and implement new versions of S2K within one month of receiving them.
5. New data bases will be developed in a timely and efficient manner to meet requirements for new approved program initiatives.
6. Participate in meetings or assume delegated responsibility on internal or departmental committees and work groups engaged in the development of plans and policy recommendations in relation to the management of environmental data.

Justification:

This work is necessary to fulfil the desired aims of established programs and new initiatives and to identify and enunciate the implications of various alternative strategies available to CCIW management groups. It also provides facilities for timely access to data and convenient analytical and interpretive tools for scientists.

STUDY TITLE	NWRI Branch Research Support - Data Management	DIV OR ORG APSD
KEY WORDS	EDP SUPPORT, SURVEILLANCE	SEC'N OR GRP DATAM
STUDY LEADER	Comba, H.	TEL: 637-4628 PAE 1716
TEAM MEMBERS	Head of Data Management and staff	DATE 82/10/06
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide scientific manuscript production services for two Divisions.
2. To provide computer based systems development support to approved internal activities by scheduling and monitoring the work.
3. To provide professional EDP consultation.
4. To provide adequate training to DM staff as resources permit and to provide training to the computer users to ensure efficient utilization of the central computing facilities.

Performance Indicators

1. Records of manuscript production will be maintained for review and submitted at six month review time and at the end of the year.
2. Work schedules will be distributed and time spent will be monitored, recorded and posted monthly. The schedules will be altered to ensure work load leveling and to meet the changing needs of CCIW. Analysis of the requirements and a review of existing software will be made before work is begun. The final product will be returned to the end user. Software will be written using self documented techniques.
3. EDP consulting services will be maintained to solve short term problems and to encourage efficient use of limited resources. More time will be spent on larger consultation requests with the work being done by the end user. This is the most effective use of DM staff.
4. Implement training program as funds permit to keep DM staff technologically abreast. Continue to provide introductory and advanced courses for computer users as needed and identify new needs for courses.

Justification

The need has previously been identified for centralized programming support to ensure efficient utilization of the CYBER machine. Expertise in various areas of endeavour are developed. Duplication of effort is avoided by centralizing the efforts. Programming support is provided to people who do not have the skills or the time or a requirement for a full time person to do the work. Effort is expended in direct support of the surveillance program.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-574

STUDY TITLE	Non-NWRI Branch Research Support - Data Management	DIV OR ORG APSD
KEY WORDS	EDP SUPPORT, SURVEILLANCE	SEC'N OR GRP DATAM
STUDY LEADER	Comba, H.	TEL: 637-4628 PAE 1716
TEAM MEMBERS	Head of Data Management and staff	DATE 82/10/06
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide computer based systems development support to approved internal activities by scheduling and monitoring the work.
2. To provide professional EDP consultation.
3. To provide training to the computer users to ensure efficient utilization of the central computing facilities.

Performance Indicators

1. Work schedules will be distributed and time spent will be monitored, recorded and posted monthly. The schedules will be altered to ensure work load leveling and to meet the changing needs of CCIW. Analysis of the requirements and a review of existing software will be made before work is begun. The final product will be returned to the end user. Software will be written using self documented techniques.
2. EDP consulting services will be maintained to solve short term problems and to encourage efficient use of limited resources. More time will be spent on larger consultation requests with the work being done by the end user. This is the most effective use of DM staff.
3. Continue to provide introductory and advanced courses for computer users as needed and identify new needs for courses.

Justification

The need has previously been identified for centralized programming support to ensure efficient utilization of the CYBER machine. Expertise in various areas of endeavour are developed. Duplication of effort is avoided by centralizing the efforts. Programming support is provided to people who do not have the skills or the time or a requirement for a full time person to do the work. Effort is expended in direct support of the surveillance program.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-575

STUDY TITLE	GEMS/UNEP - Global Water Quality Data Management	DIV OR ORG APSD
KEY WORDS	GLOBAL, WATER QUALITY, DATA MANAGEMENT, INTERNATIONAL RELATIONS	SEC'N OR GRP DATAM
STUDY LEADER	Rogalsky, J.	TEL: 637-4292
TEAM MEMBERS	R. Duffield, W. Nagel and J. Byron	PAE 1940
ECS PROGRAM	Management and Administration	DATE 82/10/06
ACTIV ELEM	International Relations	

GOALS:

1. To maintain, operate and enhance, an expanding globally centralized computer based storage and retrieval system for surface and groundwater quality data.
2. Provide for file security and controlled access.
3. Provide standard and selective data retrieval and information processing services on demand.
4. Provide training services.

PERFORMANCE INDICATORS

1. Systematic procedures will be maintained to handle irregular submissions of global water quality monitoring data from six international regions covering the globe, converting data to locally processable media from forms, listings, cards or magnetic tapes as received.
2. Data files will be updated and relevant data base management files covering station history, parameter dictionary and global water quality data will be generated and regularly and securely archived.
3. Supplementary software will be developed as required for the retrieval, summarization and display of the data and to respond to scientific and operational enquiries from 152 countries.
4. Training materials and services will be provided as required at Regional Centres in other countries.

JUSTIFICATION:

NWRI has accepted responsibility to develop, implement and operate data base management facilities for the Global Water Quality monitoring project sponsored by UNEP/WHO/UNESCO/WMO, and provide relevant expertise on request.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-576

STUDY TITLE	Mini/Micro Applications for CCIW	DIV OR ORG APSD
KEY WORDS	DATA MANAGEMENT, SURVEILLANCE, TECHNOLOGY TRANSFER, COMPUTER	SEC'N OR GRP DATAM
STUDY LEADER	Rogalsky, J.	TEL: 637-4292 PAE 1140
TEAM MEMBERS	S. Beal, J. Dowell, J. Hodson, R. Duffield	DATE 82/10/28
ECS PROGRAM	Canada/U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI and Regional Involvements in Canada/U.S. and Interprovincial Waters	

GOALS:

To acquire and/or develop mini or micro computing resources:

- a) to facilitate the automation of water quality sample documentation and analysis procedures, on board ship.
- b) to promote the standardization and transfer of technology to scientific users of desktop computers.
- c) to rationalize the development of applications on desktop machines for scientists, and
- d) to further the development of experience and skills in networking of computing resources within NWRI and other departmental components at CCIW and elsewhere.

PERFORMANCE INDICATORS:

Acquisition of appropriate hardware and development of prototype software to:

- a) prototype desirable aspects of shipboard sample documentation and handling procedures,
- b) demonstrate the adequacy of the hardware for selected scientific applications,
- c) develop prototype applications for scientists on request,
- d) develop procedures for screen displays using sub-sets of data retrieved from a Data Base Management System and make recommendations for the implementation of permanent systems on behalf of users.

JUSTIFICATION:

The rapid developments in microcomputer technology and proliferation of applications provides new opportunities to achieve improvements in operational productivity, convenience and accuracy in data handling and documentation within a research environment, and networking of computing resources.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-582

STUDY TITLE	Aquatic Regime Acidification Models and Monitoring	DIV OR ORG APSD
KEY WORDS	ACID RAIN, ENVIROMENTS, AQUATIC, MODELS	SEC'N OR GRP ENV SIM
STUDY LEADER	Thompson, M.E.	TEL: 637-4513
TEAM MEMBERS	M.B. Hutton	PAE 4300
ECS PROGRAM	M.R.C. LRTAP	
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

GOALS:

1. Using available new or updated information, develop further verification of the CDR model to low alkalinity waters of Canada.
2. Using rain chemistry data from Sable Island, verify the methodologies presently employed to calculate the sea-salt correction for maritime area waters.
3. Working in coordination with WQB, implement the LRTAP monitoring program planned during FY 82-83 and complete the plans for areas not completed during the prior year.
4. In cooperation with WQB, assure that the NAQUADAT data bases of LRTAP data are maintained on an up to date basis.

PERFORMANCE INDICATORS:

- 1a) Nova Scotia and Nfld. river data to be reexamined and an updated CDR model report completed by December 1983.
- b) A report to be prepared incorporating all other available data relating to the CDR-SO₄ loading relationships by March 1984.
2. A report on the sea-salt composition of precipitation on Sable Island to be completed by October 1983.
- 3a) In conjunction with WQB, produce a report of the operational LRTAP monitor network by October 1983.
- b) In conjunction with WQB, complete the LRTAP monitor plan by January 1984.
4. Report on the status of the LRTAP NAQUADAT data base February 1984.

JUSTIFICATION:

The DOE Strategic Plan ranks acid rain as the second in priority of all Departmental programs. The items included in this study relate directly to development and further verification of the CDR model that is presently applied to estimate target loadings of SO₄ under the Canada-United States MOI.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-583

STUDY TITLE	Coordination of IWD LRTAP Program	DIV OR ORG APSD
KEY WORDS	ACID RAIN, LRTAP, COORDINATION	SEC'N OR GRP APSDIV
STUDY LEADER	Elder, F.C.	TEL: 637-4212
TEAM MEMBERS	IWD Managers in the LRTAP Program, NWRI, NHRI, WQB, WRB	PAE 4300
ECS PROGRAM	M.R.C. LRTAP	DATE 82/10/28
ACTIV ELEM	Long Range Transport of Airborne Pollutants	

GOALS:

1. To coordinate the IWD LRTAP program under the framework of the DOE and ECS LRTAP programm plans and develop the FY 84-85 IWD LRTAP plans.
2. To monitor the progress and status of the IWD LRTAP program.
3. To represent IWD on the ECS LRTAP Committee and to provide IWD information to the DOE and Federal/Provincial LRTAP Committees and work groups.
4. To provide information flow from the IWD LRTAP program to the MOI or other International negotiating bodies.

PERFORMANCE INDICATORS:

- la) The IWD long-range operational plan for LRTAP to be updated by November 1983.
- b) The IWD LRTAP operational plan to be completed for FY 84-85 by February 1983.
- 2. Progress and status reports to be submitted to the DG at six month intervals.
- 3. IWD LRTAP program to be represented as required.
- 4. Information from the IWD program to be available to the MOI as required.

JUSTIFICATION:

The Acid Rain program is given a priority two of all Departmental programs in the DOE Strategic Plan. The ECS Strategic Plan also places high priority on the LRTAP program. The IWD program is a vital component of the ECS and DOE LRTAP programs.

ANALYTICAL METHODS DIVISION

STUDIES FOR ANALYTICAL METHODS DIVISION

STUDY LEADER 93/06/15.

STUDY TITLE

SECTION	STUDY	STUDY TITLE
ANALYTICAL CHEMISTRY RESEARCH		
601	601	EXPLORATION OF NARROW-BORE HOLLOW COLUMNS FOR FASTER ANALYSES OF TOXICS
602	602	DETERMINATION OF ELEMENTS AND ORGANOMETALS BY ICP & MICROWAVE PLASMA
603	603	ELECTROANALYTICAL TECHNIQUES IN WATER ANALYSIS
604	604	HIGH PRESSURE LIQUID CHROMATOGRAPHY FOR TRACE ORGANICS
605	605	GENERAL MAINTENANCE AND TECHNOLOGY TRANSFER
606	606	ACRS CAPITAL ACQUISITION
615	615	TOXAPHENE METHODOLOGY USING HRGC-MS-SIM
616	616	RADIOIMMUNOASSAY TECHNIQUES FOR DIOXINS
617	617	VALIDATION OF TOXAPHENE METHODOLOGY
619	619	BENZOFURANS AND DIOXIN METHODOLOGY
DIVISION		
600	600	ANALYTICAL METHODS DIVISION ADMINISTRATION
COMPUTER SERVICES		
670	670	COMPUTER SERVICES FOR WATER MANAGEMENT RESEARCH
620	620	CCW COMPUTING REQUIREMENTS REVIEW (1984 TO 1989)
MICROBIOLOGY LABORATORIES		
621	621	MEDIA WASH-UP, INSTRUMENT AND GENERAL SUPPORT
622	622	LEGIONELLA
623	623	MESOCOSYSTEMS AND MICROBIAL NITROGEN CYCLE METHODOLOGY
624	624	BACTERIAL TOXICITY WORKSHOP
626	626	BACTERIAL SURVEILLANCE & MICROBIAL RESPONSE TO ACID STRESS
QUALITY ASSURANCE METHODS		
641	641	QUALITY ASSURANCE AND METHODS SECTION-ADMINISTRATION AND MANAGEMENT
642	642	METHODS DEVELOPMENT FOR HERBICIDES
643	643	WOB AND PWB QUALITY ASSURANCE PROGRAM
644	644	DEVELOPMENT OF METHODS & CERTIFIED REFERENCE MATERIALS (INORGANICS)
645	645	PRESERVATION STUDIES FOR INORGANICS
647	647	CAPITAL EQUIPMENT ACQUISITION (QAMS)
653	653	IJC QUALITY ASSURANCE
654	654	LRTAP INTERLAB QUALITY ASSURANCE STUDIES (AQUEOUS PHASE)
655	655	QUALITY ASSURANCE PROGRAM - DREDGING
657	657	ORGANICS STANDARD REFERENCE MATERIALS AND QUALITY CONTROL STUDIES
ONUSKA, F. I.		
		GOLDEN, P. D.
		SEKERKA, T.
		AFGHAN, B. K.
		AFGHAN, B. K.
		AFGHAN, B. K.
		ONUSKA, F. I.
		AFGHAN, B. K.
		AFGHAN, B. K.
		AFGHAN, B. K.
PULLEY, H. C.		
		PULLEY, H. C.
RAO, S. S.		
		MC INNIS, R
		DUTKA, B. J.
		DUTKA, B. J.
		DUTKA, B. J.
		RAO, S. S.
CHAU, A. S. Y.		
		VACANT
		CHAU, A. S. Y.
		CHEAM, V.
		CHAU, A. S. Y.
		CHAU, A. S. Y.
		CHAU, A. S. Y.
		ASPILA, E.
		CHAU, A. S. Y.
		LEE, H. B.

NO	ORGANIZATION			ENGINEERING			TECHNICAL OPERATIONS			DATA N-			EXTERNAL			TOTAL RESOURCES		
	PY SAL	CAP	FY SAL	FY SAL	OR	CAP	PY SAL	CAP	CVTM	PY SAL	AGCY	PY SAL	OR	CAP	COST	SAL	CAP	
600	2.00	68	73.0	3.0	--	--	--	--	--	--	--	--	--	--	--	2.0JU	63	73.0
601	1.20	56	25.0	4.0	--	--	--	--	--	--	--	--	--	--	--	1.2JU	54	25.0
602	1.60	66	15.0	7.0	--	--	--	--	--	--	--	--	--	--	--	1.6JU	66	15.0
603	1.60	66	10.0	8.0	1.25	4.2	1.5	2.0	0.94	1	1.4	0.2	2.2	2.2	2.2	21.5	2.89	103
603	1.60	39	13.0	15.0	0.26	3	0.6	--	--	--	--	--	--	--	--	1.36	48	13.6
604	1.10	67	17.0	18.0	0.63	1	0.2	--	0.12	1	0.2	--	0.5	--	--	--	--	15.0
605	1.50	60	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	76.6
606	--	--	89.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	69.0
615	•60	615	•60	--	--	--	--	--	0.02	1	0.2	--	0.5	--	--	5.0	1.55	70
616	•20	11	6.6	10.0	--	--	--	--	0.02	1	0.2	--	0.5	--	--	--	--	31.7
616	616	616	616	--	--	--	--	--	--	--	--	--	--	--	--	5.0	1.55	70
617	•10	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	217.3
619	1.20	40	--	--	--	--	--	--	--	0.02	1	0.2	--	0.5	--	5.0	1.22	51
619	619	619	619	--	--	--	--	--	--	--	--	--	--	--	--	5.0	1.22	42
621	2.00	43	25.5	12.0	0.63	3	0.5	--	0.25	7	4.0	--	3.5	--	--	5.0	1.22	42
622	1.40	40	4.1	--	--	--	--	--	0.02	1	0.2	--	0.2	--	--	5.0	1.22	42
622	622	622	622	--	--	--	--	--	--	--	--	--	--	--	--	5.0	1.22	42
623	1.40	46	6.7	--	--	--	--	--	--	--	--	--	--	--	--	2.0	1.44	42
624	•20	10	4.0	--	--	--	--	--	--	--	--	--	--	--	--	2.0	1.44	42
626	2.00	73	8.1	--	--	--	--	--	0.24	6	2.0	--	0.6	2	--	--	--	52.7
626	626	626	626	--	--	--	--	--	--	--	--	--	--	--	--	2.0	1.44	42
641	•60	27	6.0	--	0.13	1	0.1	--	0.10	3	0.5	--	0.5	--	--	5.0	1.22	42
641	641	641	641	--	--	--	--	--	--	--	--	--	--	--	--	5.0	1.22	42
642	1.10	35	10.0	3.0	0.15	2	0.2	0.5	--	--	--	--	--	--	--	1.15	37	10.2
643	1.10	35	16.0	2.0	--	--	--	--	--	--	--	--	--	--	--	1.15	37	10.2
643	643	643	643	--	--	--	--	--	--	--	--	--	--	--	--	0.0	1.15	37
645	--	16.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0
645	645	645	645	--	--	--	--	--	--	--	--	--	--	--	--	0.0	1.15	37
647	--	--	--	0.3	0.6	--	--	--	--	--	--	--	--	--	--	--	--	5.0
653	1.00	35	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	1.15	37

PROCESSING FORM FEE DIVISION A-D

FATE RUN 55/25/13.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-600

STUDY TITLE	Analytical Methods Division Administration		DIV OR ORG AMD
KEY WORDS	ADMINISTRATION, METHODS DEVELOPMENT, QUALITY CONTROL		SEC'N OR GRP AMDDIV
STUDY LEADER	Lawrence, J.	TEL: 637-4319	PAE 1715
TEAM MEMBERS	J. Burford		DATE 82/10/27
ECS PROGRAM	Water Management Research		
ACTIV ELEM	Analytical Methods		

Goals:

To ensure effective administration of the Analytical Methods Division and to provide leadership to the scientific program.

Performance Indicators:

Plan, implement and administer the activities of the Analytical Methods Division - ongoing.

Justification:

The Analytical Methods Division responds to the needs of scientists in other NWRI research divisions, WQB, EPS, GLFRB and ECS.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-601

STUDY TITLE	Exploration of Narrow-Bore WCOT Columns for Faster Analyses of Toxics	DIV OR ORG AMD
KEY WORDS	DIOXINS, TOXAPHENE, METHODS DEVELOPMENT	SEC'N OR GRP ACRS
STUDY LEADER	Onuska, F.I.	TEL: 637-4635 PAE 4200
TEAM MEMBERS	K. Terry and Incumbent	DATE 82/10/25
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. Adoption of the GC instrumentation for narrow bore WCOT columns.
2. Preparation of narrow bore glass WCOT columns with i.d. of 100 to 200 μm range.
3. Optimization attempt to resolve all 22 TCDD isomers and eventually all available chlorinated dibenzo-p-dioxins.
Quantitative HRGC and HRGC/MS evaluation using narrow bore WCOT columns and real samples of fish and sediment (max .5 + 5).
4. Qualitative and quantitative toxaphene analyses will be attempted using HRGC.

Performance Indicators:

1. Modification of pneumatic and injection systems (April to May 1983).
2. Drawing and coating (April to June 1983).
3. Final report on the optimization, March 1984.
Final report by March 1984.
4. Reporting by March 1984 based on the above further validation of methodology FY 1984.

Justification:

These two goals represent most difficult tasks in environmental analytical chemistry and would promote co-operation with leading laboratories in the U.S. and in Europe.

NATIONAL WATER RESEARCH INSTITUTE		Study Plan	NO: 83-602
STUDY TITLE	Determination of Elements and Organometals by ICAP & Microwave Plasma		DIV OR ORG AMD
KEY WORDS	TOXIC SUBSTANCES, ORGANICS, METALS, ORGANOTINS, ANALYTICAL METHODS		SEC'N OR GRP ACRS
STUDY LEADER	Goulden, P.D.	TEL: 637-4658	PAE 4200
TEAM MEMBERS	D.H.J. Anthony		DATE 82/10/25
ECS PROGRAM	MRC - Toxic Substances		
ACTIV ELEM	Toxic Chemicals		
<u>Goals:</u>			
<ol style="list-style-type: none"> 1. Determine the sensitivity and detection limits for S, N and halogens. 2. Compare detection limits by ICAP and microwave plasma. 3. Determine detection limits for organometallics particularly organotins. 4. Develop methods for determination of tin, total and organic in fish tissue. 			
<u>Performance Indicators:</u>			
<ol style="list-style-type: none"> 1. Internal report and/or publication (February). 2. Internal report and/or publication (February). 3. Internal report and/or publication (March). 4. Internal report and/or publication (March). 			
<u>Justification:</u>			
<p>In response to requests from WQB, GLFRB and other clients, see attached page for further justification.</p>			

STUDY TITLE	Electroanalytical Techniques in Water Analysis	DIV OR ORG AMD
KEY WORDS	ANALYTICAL METHODS, ORGANICS, METALS, SPECIATION, PROFILING SYSTEM, METHODS DEVELOPMENT	SEC'N OR GRP ACRS
STUDY LEADER	Sekerka, I.	TEL: 637-4667
TEAM MEMBERS	J.F. Lechner	PAE 1715
ECS PROGRAM	Water Management Research	DATE 82/10/25
ACTIV ELEM	Analytical Methods	

Goals:

1. To expand alternating standard-sample technique.
2. To develop a technique for the field sampling and preconcentration of metals.
3. To develop methods of water analysis employing flow injection technique.
4. To study the application of electrochemical sensors for separation techniques.

Performance Indicators:

1. Incorporation of pH, Cl and K sensors in the field system (October 1983)
2. Field testing of developed device (August 1983)
3. a) Interfacing of FI analyzer to electrochemical detector (September 1983)
 b) Interfacing to photo- and fluorometric detectors (January 1984)
 c) Interfacing to atomic absorption (April 1984)
4. Design of the detector employing ion-selective electrodes (April 1984)

Justification:

Electrochemical techniques are of great importance in studying the equilibria, formation and transformation of metal-organic compounds, in routine analysis of water quality parameters and in field measurement and monitoring.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-604

STUDY TITLE	High Pressure Liquid Chromatography for Trace Organics	DIV OR ORG AMD
KEY WORDS	ORGANICS, ANALYSIS, POLYNUCLEAR AROMATIC HYDROCARBONS, ANALYTICAL METHODS	SEC'N OR GRP ACRS
STUDY LEADER	Afghan, B.K.	TEL: 637-4661 PAE 4200
TEAM MEMBERS	J.F. Ryan	DATE 82/10/25
ECS PROGRAM	MRC - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. To validate Phthalate Ester Methodology.
2. To continue developing and testing AMI-II.
3. To explore analytical application of HPLC - Electroanalytical/spectroscopic technique for analysis of nitro and amino compounds.

Performance Indicators:

1. Final report August 1983.
2. Final report March 1984.
3. Literature review (June 1983). HPLC sep and detection (September/October 1983).
Evaluation of concentration and cleanup techniques (March 1984).
Based on the above, further validation of methodology will be carried out in FY 84/85.

Justification:

To meet the needs of IWD operational units in the area of improved methodology for the above compounds in environmental samples.

STUDY TITLE	General Maintenance and Technology Transfer	DIV OR ORG AMD
KEY WORDS	ANALYTICAL METHODS, TECHNOLOGY TRANSFER, ADMINISTRATION	SEC'N OR GRP ACRS
STUDY LEADER	Afghan, B.K.	TEL: 637-4661 PAE 4200
TEAM MEMBERS	J.F. Ryan, P.D. Goulden, D. Anthony, I. Sekerka, F. Onuska, K. Terry and J. Lechner	DATE 82/10/25
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. To provide, on a continuing basis, consultation and assistance to transfer methodologies developed within ACRS.
2. To provide specialized services using GC/MS.
3. To participate in the work of ASTM, ISO and other agencies involved in standardization of analytical methodology.

Performance Indicators:

1. Number of methods (2-4) will be transferred to IWD laboratory on a need basis. Documented methods suitable for methods manual will be prepared.
3. Methods will be written in draft form using ASTM and ISO formats for consideration as ASTM and/or ISO standards.

Justification:

This type of support is required to satisfy IWD operational laboratory requirements as well as to promote the work of ACRS at the international level.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-606

STUDY TITLE	ACRS Capital Acquisition	DIV OR ORG AMD
KEY WORDS	CAPITAL	SEC'N OR GRP ACRS
STUDY LEADER	Afghan, B.K.	TEL: 637-4661 PAE 1715
TEAM MEMBERS	P.D. Goulden, F.I. Onuska, I. Sekerka	DATE 82/10/25
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Analytical Methods	

Goals:

1. To review the manufacturers' specifications and purchase capital items.

Performance Indicators:

1. Equipment will be reviewed and ordered by August 1983.

Justification:

New instruments will be required to carryout methods development work as outlined in ACRS studies for FY 83/84.

STUDY TITLE	Toxaphene Methodology using HRGC-MS-SIM	DIV OR ORG AMD
KEY WORDS	METHODS DEVELOPMENT, FISH, SEDIMENTS, ANALYTICAL METHODS, ORGANICS	SEC'N OR GRP ACRS
STUDY LEADER	Onuska, F.I.	TEL: 637-4635 PAE 4200
TEAM MEMBERS	K. Terry and Incumbent	DATE 82/10/27
ECS PROGRAM	MRC - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. Toxaphene - multiresidue fish and sediment samples clean-up (max. 20 samples) using M.A. Ribick, G.R. Dubay, J.D. Petty, D.L. Stalling and C.J. Schmidt procedure consisting of column extraction, GPC, Florisil and Silica gel chromatography and H_2SO_4/HNO_3 extraction steps.
2. Attempt to confirm Toxaphene by generating full scan at $R = 5000$ at 100 ng level.
3. Toxaphene-quantitative determination methodology using HRGC-MS-PICI-SIM*.
4. Confirmation of chlorinated dibenzo-p-dioxins in samples submitted by DOE agencies.

Performance Indicators:

1. End of June 1983. Report by K. Terry.
2. September 1983. Report by K. Terry.
3. March 1984. Report by F.I. Onuska.
4. As requested.

* If high purity toxaphene is not available preparation of high purity standard will be performed.

Justification:

There is no toxaphene quantitative methodology available yet and this study will promote a mutual co-operation with laboratories in the U.S. and Europe.

STUDY TITLE	Radioimmunoassay Techniques for Dioxins	DIV OR ORG AMD
KEY WORDS	ANALYTICAL METHODS, DIOXINS, METHODS DEVELOPMENT	SEC'N OR GRP ACRS
STUDY LEADER	Afghan, B.K.	TEL: 637-4661 PAE 4200
TEAM MEMBERS	J.P. Sherry, R.J. Wilkinson	DATE 82/10/27
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. To develop in-house expertise in the area of radioimmunoassay.
2. Comparative testing of radioimmunoassay techniques with GC and GC/MS methods.
3. Analytical Potential of Hybridoma and Enzymatic techniques for screening PCDD's and PCDF's.

Performance Indicators:

1. Method utilizing radioimmunoassay will be tested and put into operation for routine usage (October 1983).
2. Number of techniques will be evaluated with radioimmunoassay (December 1983).
3. Initial work will be initiated to evaluate the feasibility of using Hybridoma and/or Enzymatic techniques as screening techniques for PCDD's and PCDF's.

Justification:

The evaluation of radioimmunoassay technique was initiated to satisfy IWD requirement of having screening capability for dioxins with special reference to 2,3,7,8-TCDD and other isomers or PCDD's.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-617

STUDY TITLE	Validation of Toxaphene Methodology	DIV OR ORG AMD
KEY WORDS	ANALYTICAL METHODS, TOXAPHENE	SEC'N OR GRP ACRS
STUDY LEADER	Aghan, B.K.	TEL: 637-4661 PAE 4200
TEAM MEMBERS	J.F. Ryan	DATE 83/02/09
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals

1. To validate analytical methodology for toxaphene.

Performance Indicators

1. Current methods used by WQB-Ontario Region or other routine laboratories in Canada for the analysis of toxaphene have not been thoroughly performance tested. The purpose of this study is to generate sufficient data to test various steps in the analysis such as concentration, cleanup and quantitation using fish and water samples.

Five fish samples varying in lipid/toxaphene samples will also be spiked at different levels and analyzed to check the precision of the analytical scheme. Selected samples will also be analyzed by various laboratories engaged in toxaphene analysis in Ontario Region. These results will provide the basis for establishing the precision and accuracy.

Justification

This study is initiated at the request of Dr. Hallet to provide independent evaluation of the performance of analytical methodology for toxaphene in fish and water samples.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-619

STUDY TITLE	Benzofurans and Dioxin Methodology	DIV OR ORG AMD
KEY WORDS	DIOXINS, METHOD DEVELOPMENT, ORGANICS	SEC'N OR GRP ACRS
STUDY LEADER	Afghan, B.K.	TEL: 637-4661
TEAM MEMBERS	R.J. Wilkinson	PAE 4200
ECS PROGRAM	M.R.C. - Toxic Substances	DATE 82/10/27
ACTIV ELEM	Toxic Chemicals	

Goals:

1. To develop concentration, cleanup and quantitative method for polychlorinated dibenzofurans.
2. To test the methodology on fish and sediment samples.
3. To extend the scope of the methodology developed during FY 82/83 for PCDD's to include other isomers.

Performance Indicators:

1. To evaluate and improve concentration cleanup and separation techniques for available isomers (10-15) (February, 1984).
2. To test quantitative recoveries for PCDDs (April to August, 1983).
3. The methodologies will be tested using spiked samples (May, 1984).

Justification:

The methods development is initiated to satisfy IWD, GLFRB requirements for in-house routine analytical capability within their service laboratory.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-621

STUDY TITLE	Media, Wash-up, Instrument and General Support	DIV OR ORG AMD
KEY WORDS	MICROBIOLOGY, BACTERIA, EQUIPMENT	SEC'N OR GRP MLS
STUDY LEADER	McInnis, R.	TEL: 637-4581 PAE 1715
TEAM MEMBERS		DATE 82/10/25
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Analytical Methods	

Goals:

1. To provide, as required, media and wash-up support to the Microbiology Section, and other NWRI and CCIW units requiring this service.
2. To maintain common user equipment in good repair.
3. To maintain cultures of bacteria.

Performance Indicators:

1. Customer satisfaction and projects not being delayed by services required.
2. Projects not being unduly delayed.

Justification:

Without this support no microbiology could be accomplished. QAM round robin and quality control studies are dependent on chemically clean glassware and plastic ware provided by this unit.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-622

STUDY TITLE	Legionella	DIV OR ORG AMD
KEY WORDS	METHODS DEVELOPMENT, BACTERIA, HABITATS	SEC'N OR GRP MLS
STUDY LEADER	Dutka, B.J.	TEL: 637-4286 PAE 1715
TEAM MEMBERS	K. Walsh	DATE 82/10/25
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Analytical Methods	

Goals:

1. With NH&W, sample one cooling tower, on 3 to 4 week basis. April to December and if possible sample ambient air for Legionella.
2. With NH&W, sample major cities (2 sites per city) e.g. Halifax, Quebec, Montreal, Ottawa, Winnipeg, Calgary or Edmonton, and Vancouver or Victoria. During the July to August period.
3. Field trip to PEI, Nova Scotia and New Brunswick to collect and partially process approximately 50 water samples.
4. Investigate longevity of legionella bacillus in various soils.
5. Evaluate distribution pattern of legionella in Lake Superior.
6. Initiate chemostat studies on relationship of algae and legionella survival and multiplication.

Performance Indicators:

1. Summary Report March 31.
2. Data from samples in October 1983.
Report by March 31, 1984.
3. Data on presence or absence October 1983.
4. Data on completion.
Report - March 31, 1984.
5. Data approximately 1 month after each cruise.
Report March 31, 1984.
6. Data March 31, 1984.

Justification:

NH&W has indicated their interest in trying to establish the distribution pattern of Legionella in Canadian waters and industrial cooling towers, in order to develop an epidemiological model to assess the true hazard from this organism. NH&W supports the project by contracting sample collections.

STUDY TITLE	Toxicity Screening and Microbial Nitrogen Cycle Methodology	DIV OR ORG AMD
KEY WORDS	ACID RAIN, ECOSYSTEM, BACTERIA, NITROGEN, TOXICITY TESTS	SEC'N OR GRP MLS
STUDY LEADER	Dutka, B.J.	TEL: 637-4286
TEAM MEMBERS	A. Jova	PAE 1715
ECS PROGRAM	Water Management Research	DATE 82/10/26
ACTIV ELEM	Analytical Methods	

Goals:

1. To evaluate pH level and buffering capacity below which nitrification and denitrification processes are hindered or cease in acid stressed waters in chemostat studies.
2. Field evaluation of selected techniques in acid stressed waters and sediments.
3. To evaluate the potential of using a microbial electrode system to assess toxicant activity and to establish the appropriate microbial target species and incubation period.
4. Compare the procedure to Microtox, Spirillum, SAS data using standardized set of single and mixed chemicals.
5. Initiate field studies comparing the procedures.

Performance Indicators

1. Report June 30, 1983
2. Report March 31, 1984
3. Preliminary report February 1984

Justification

Studies have indicated that the nitrification process is slowed or inhibited in waters subjected to acid rain and possibly other chemical stresses. One of the ways of testing for nitrification potential is through the measurement of specific heterotrophic bacteria which are involved in aquatic nitrification. The microbial electrode system which is based on the Salmonella electrode system for screening mutagens, if applicable for screening chemicals and effluents for toxic activity will provide a simple, inexpensive and reliable means of screening for toxic activity.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-624

STUDY TITLE	Bacterial Toxicity Workshop	DIV OR ORG AND
KEY WORDS	TOXIC SUBSTANCES, WORKSHOP, BACTERIA	SEC'N OR GRP MLS
STUDY LEADER	Dutka, B.J.	TEL: 637-4286 PAE 4200
TEAM MEMBERS	D.L.S. Liu	DATE 82/10/26
ECS PROGRAM	MRC - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. Hold First International Symposium on Toxicity Testing using Bacteria.
2. Update mailing list and design brochure for Second International Symposium on Toxicity Testing using Bacteria - May 15 to 19, 1985.
3. Mailing of first announcement for 2nd International Symposium - May 15 to 19, 1985.

Performance Indicators

1. Symposium May 15 to 19, 1983.
2. Completion December 30, 1983.
3. Completion March 1, 1984.

Justification

Bacterial screening tests for toxicity are gaining international recognition as a means of economically and efficiently screening for toxicants in environmental samples. Consequently, several European countries have included such procedures into their official government standards. This symposium will bring an international view to Canadian managers and will provide a forum for researchers.

07/82

FORM A, PART 1

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-626

STUDY TITLE	L. Superior Bacterial Surveillance & Microbial Response to Acid Stress	DIV OR ORG AMD
KEY WORDS	BACTERIA, ACID RAIN, MICROSCOPY, INTERNATIONAL JOINT COMMISSION	SEC'N OR GRP MLS
STUDY LEADER	Rao, S.S.	TEL: 637-4312 PAE 1715
TEAM MEMBERS	A.A. Jurkovic	DATE 82/10/26
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Analytical Methods	

Goals:

1. To collect information on Bacteriological Water Quality Conditions in Lake Superior in accordance with the surveillance plan to detect new or emerging problem areas.
2. To provide information to the IJC on the existing bacterial water quality conditions as compared to conditions in 1973/74.
3. To collect information on bacterial response (respiration) from sediment cores from acid stressed and non-acid stressed lakes near Sudbury) (2 sets of triple benthos cores and water will be collected during the spring, summer, fall and winter).
4. To complete writing up of report/paper on work done during 1981/82, and 1982/83.

Performance Indicators:

1. May to October, 1983.
2. March 1984.
3. April to December 1983.
4. March 1984.

Justification:

(Goals 1 and 2) - Microbiology labs, CCIW, has provided the IJC with information on baseline levels in the upper Great Lakes (1974 IJC report) and in acid stressed lakes in Ontario. It was proposed to provide follow up information to the IJC on L. Superior during 1983/84 (as required under Canada/US Agreement). The study adheres to the IJC, GLISP). (Goals 2 and 3) - Microbial processes are essential in food chain and nutrient cycling processes in lake. Studying the effects of pH stress on the microbial processes will throw light on the extent the microbial process are affected by acid stress and subsequent build up of organic matter in lakes. As was also indicated in the 82/83 study forecast, a detailed report will be produced at the end of FY 1983.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-641

STUDY TITLE	Quality Assurance and Methods Section - Administration and Management	DIV OR ORG AMD
KEY WORDS	ADMINISTRATION, QUALITY CONTROL, METHODS DEVELOPMENT	SEC'N OR GRP QAMS
STUDY LEADER	Chau, A.S.Y.	TEL: 637-4653 PAE 1612
TEAM MEMBERS		DATE 82/10/26
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories of NWRI	

Goals:

To administer and participate in the activities and projects of the Section to ensure that objectives are met and maximum efficiency.

Performance Indicators:

1. Evaluation of experimental data.
2. General administration of the Section.
3. To write or participate in writing reports of QC studies and methods development.
4. Serve as a General Referee of the Association Official Anal. of Chemists.
5. Serve as a Task Group Chairman in ASTM (attend one of the two meetings).

Justification:

To ensure that objectives set for the Section are met and the activities are carried out efficiently.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-642

STUDY TITLE	Methods Developments for Herbicides	DIV OR ORG AMD
KEY WORDS	TOXIC SUBSTANCES, METHOD DEVELOPMENT	SEC'N OR GRP QAMS
STUDY LEADER	Y. Stokker	TEL: PAE 4200
TEAM MEMBERS	A.S.Y. Chau	DATE 82/10/26
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. To complete methods for the analysis of 10 acid herbicides in water, and for the analysis of TCA and Dalapon in water and in sediments.
2. To integrate the analysis of 10 acids and 7 neutral herbicides with the analysis of TCA and Dalapon in water and in sediment.

Performance Indicators:

1. Extend literature method, slight modification, if necessary (May). Extraction, cleanup and sample applicability of the developed method to natural waters (August). Report with single operator statement on precision, accuracy and detection limit at 2 to 3 concentration levels (September).
2. Integrate the analysis and provide overall single operator statement as above (January 1983).

Justification:

This study will complete the request of WQB (Western Region).

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-643

STUDY TITLE	WQB and PPWB Quality Assurance Program	DIV OR ORG AMD
KEY WORDS	INTERLABORATORY STUDIES, DATA QUALITY	SEC'N OR GRP QAMS
STUDY LEADER	Chau, A.S.Y.	TEL: 637-4645
TEAM MEMBERS	H. Alkema	PAE 1612
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Labs at NWRI	

Goals:

1. At the request of IWD Headquarters, conduct two quality control studies bimonthly to include 5 WQB regional labs and 3 Prairie province labs.
2. Generate interlaboratory accuracy, precision and detection limit statements for methods in the WQB Analytical Methods Manual by special studies (specification project).

Performance Indicators:

1. Prepare and check test samples (on going). Distribute bimonthly test samples for some 40 inorganic parameters to 5 WQB and 3 PPWB laboratories. Evaluate data and generate a report (one every 2 months).
2. Prepare several (minimum 3) reference water samples for specification project for major ion and trace metal (on going, to replenish those used up). In-house training on organic analysis.

Justification:

Requested from IWD headquarters to ensure reliability and compatibility of data generated by WQB labs and also by the laboratories of the Prairie Provinces Water Board.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-644

STUDY TITLE	Methods Development of Certified Reference Materials (Inorganics)	DIV OR ORG AMD
KEY WORDS	TRACE METALS, METHOD DEVELOPMENT, STANDARD REFERENCE MATERIALS, QUALITY CONTROL	SEC'N OR GRP QAMS
STUDY LEADER	Cheam, V.	TEL: 637-4645 PAE 1612
TEAM MEMBERS	A.S.Y. Chau	DATE 82/10/26
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

Goals:

1. To validate the ion chromatography methods for major ions, in particular SO₄ in soft and colored waters, and to test the methods' compatibility by a special Quality Control study.
2. To develop reference materials and certified reference materials to support the Inter-regional and the Prairie Provinces Water Board Quality Assurance Programs. A water trace metal reference material will be certified.

Performance Indicators:

1. Report December 1983.
2. Continuing activity; Report March 1984.

Justification:

1. Upon request from Atlantic region and as observed in several interregional quality control studies, there is a definite need to solve the incompatibility of data for ions, in particular, sulfate, in soft and colored waters.
2. The development of reference materials and certified reference materials is required to support IRQC and PPWB quality assurance programs.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-645

STUDY TITLE	Preservation Studies for Inorganics	DIV OR ORG AMD
KEY WORDS	TRACE METALS, NUTRIENTS, ANALYSIS	SEC'N OR GRP QAMS
STUDY LEADER	Chau, A.S.Y.	TEL: 637-4653 PAE 1612
TEAM MEMBERS	A. Chemist and a Technologist I. Sekerka, J.F. Lechner	DATE 82/11/04
ECS PROGRAM	Water Management Data	
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

Goals:

To evaluate and improve sample preservation procedures to be used by the consolidated water quality laboratory

Performance Indicators:

1. Definition of problem
 - (a) Review of literature and evaluate current status - July 1983
 - (b) Evaluation of current method used by WQB - December 1983
 - (c) Comparison of existing methods with the "state of art" of aquatic chemistry and limnology of selected parameters (pH, Cond., D.O., Ncomp, Cl, carbonate, alk, acidity and trace metals (September 1983)
2. Optimize preservation procedures for major ions and nutrients in water and identify areas that need research (a min. of 2 levels) Phase 1 - Major ion - March 1984.
3. Three reports on:
 - (a) Evaluation of current status on preservation of inorganics and organics July 1983
 - (b) Method evaluation - December 1983
 - (c) Major ion procedures - March 1984

Justification:

This study constitutes the first part of the proposal as delineated in the memo, September 15, 1982 "Sample Handling Needs Related to Laboratory Consolidation" by the Director, WQB, Ottawa and A/Director, NWRI. Improved sample preservation techniques will be critical to the success of the consolidated water quality laboratory. The reliability of preservation techniques for over 100 parameters must be fully established.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-647

STUDY TITLE	Capital Equipment Acquisition (QAMS)	DIV OR ORG AMD
KEY WORDS	QUALITY CONTROL, METHODS DEVELOPMENT	SEC'N OR GRP QAMS
STUDY LEADER	Chau, A.S.Y.	TEL: 637-4319
TEAM MEMBERS		PAE 1612
ECS PROGRAM	Water Management Data	DATE 82/10/26
ACTIV ELEM	Water Management Data: National Standards Laboratories at NWRI	

Goals:

1. To purchase capital equipment necessary for the implementation of 83/84 study plans.
2. To acquire capital equipment necessary for the maintenance of expertise within AMD.
3. To replace obsolete equipment in accordance with the long term replacement plan.

Performance Indicators:

Funds to be committed by September 1983.

Justification:

To fulfil the responsibilities of the Analytical Methods Division requires acquisition of new instrumentation reflecting the latest advances in analytical technology and to replace obsolete, existing instrumentation.

STUDY TITLE	IJC Quality Assurance	DIV OR ORG AMD
KEY WORDS	INTERNATIONAL JOINT COMMISSION, QUALITY ASSURANCE	SEC'N OR GRP QAMS
STUDY LEADER	Inorganics - Aspila, K. Organics - Chau, A.S.Y.	TEL: 637-4638 637-4653 PAE 1140
TEAM MEMBERS		DATE 82/10/26
ECS PROGRAM	Canada-U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI and Regional Involvement in Canada-US & Interprovincial Waters	

Goals:

1. Major Ions in Water (1 study) - Organize bottles and inventory of test samples and distribute to 35 Great Lakes laboratories (15 samples, 14 parameters).
2. Total Phosphorus in STP Effluents (2 studies) - Collect effluents, prepare sample and distribute to 50 STP's.
3. Toxics in Fish (1 study).
 - a) Establish contract for analysis (PCBs, OCs, Toxaphene); b) prepare reference samples; c) prepare fish extracts and confirm stability; d) Analyze fish homogenates; e) design, prepare, package, and distribute study.
4. Sediment (Toxic Organics)
 - 1a) Select contract labs for OC or chlorobenzene analysis; b) screen sediments for selection of parameters; c) prepare ampules; d) confirm design values; e) confirm stability of materials; f) design, prepare and distribute study.
 - 2a) Institute development of RM's and one CRM for PAH's and continue development of CRM for chlorobenzenes.
5. Ongoing Data Quality Work Group activities.

Performance Indicators:

1. April to October 1983.
2. July to December 1983.
3. a) April-Oct., 1983; b) July-Sept.; c) July-Oct.; d) July-Oct. e) Jan. 1984.
4. 1a) April-Oct. 1983; b) Oct-Nov; c) Dec. 1983; d) Jan-Feb. 1983; e) Dec. 1982 to Feb. 1983; f) Jan to Mar. 1983.
2a) Sept. to March, 1983.
5. On-going.

Justification:

To respond to the Canada-U.S. Agreement, various IJC committees and the Data Quality Work Group.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-654

STUDY TITLE	LRTAP Interlab Quality Assurance Studies (Aqueous Phase)	DIV OR ORG AMD
KEY WORDS	LRTAP, QUALITY ASSURANCE	SEC'N OR GRP QAMS
STUDY LEADER	Aspila, K.	TEL: 637-4638 PAE 4300
TEAM MEMBERS	S. Todd	DATE 82/10/26
ECS PROGRAM	M.R.C. - LRTAP	
ACTIV ELEM	Long Range Transport of Air Pollutants	

Goals:

1. Collect or obtain waters from LRTAP watershed programs and LRTAP precipitation programs. Maintain and monitor inventory.
2. Prepare bottles, subdivide stock reference waters, package and distribute interlab study after verification (4 studies; 3 for major ions and one for trace metals).
3. Prepare technical reports on study detail.
4. Document, interpret and prepare reports for the LRTAP QA subgroup after each study is completed.
5. Maintain liaison with analysts, managers, users of data and the LRTAP work groups.
6. Prepare reference standards and analyze.

Note:

- a) The PY to provide the above performance is not confirmed for FY 83/84.
- b) The specific studies in Goal 2 will be defined by the LRTAP QA subgroup.

Performance Indicators:

1. 1 barrel quarterly.
2. One study at 2 to 3 month intervals.
3. Quarterly.
4. One study at 2 to 3 month intervals.
5. Attend meeting.
6. 1 RM on a quarterly basis.

Quality Work Group.

Justification:

To respond to the quality assurance needs identified by the LRTAP quality assurance subgroup of the federal-provincial RMCC.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-655

STUDY TITLE	Quality Assurance Program - Dredging	DIV OR ORG AMD
KEY WORDS	INTERNATIONAL JOINT COMMISSION, QUALITY ASSURANCE, WATER AND SEDIMENTS	SEC'N OR GRP QAMS
STUDY LEADER	Chau, A.S.Y.	TEL: 637-4653 PAE 1140
TEAM MEMBERS	Term Technician	DATE 82/02/23
ECS PROGRAM	Canada-US and Interprovincial Waters	
ACTIV ELEM	NWRI & Regional Involvements in Canada-U.S. & Interprovincial Waters	

Goals

1. To critically assess the quality of data obtained through laboratory analysis on water and sediment related to dredging projects.
2. Provide a means of ongoing control of the quality of these data.
3. Provide a means to ensure the precision and accuracy of data generated by various laboratories.
4. Develop and prepare suitable reference sediment samples to assist the above goals.

Performance Indicators

1. Familiarize the new staff on QA/QC - April 1, 1983.
2. Review previous mini Q.C. studies on private laboratories for PCBs analysis - June 1983.
3. Design and conduct a PCB Q.C. study to include more private labs. (Sept. 1983) - report March 1984.
4. Prepare Q.C. samples for a mini QC study to assess performance of selected private labs for trace metal analysis - August 1983.
5. Design and conduct the trace metal study (Nov. 1983) a report by Feb. 1984.
6. First phase of development of CRMs for trace metal in sediment - screen sediments for suitable levels and parameters - initiates on January 1984.

Justification

Through support of this proposal, Canada can meet its commitment made in Annex II of the GLWQA to undertake surveillance and monitoring programs and to provide support to work being undertaken under GLWQA article VI(g) to introduce measures to abate and control pollution from Great Lakes dredging activities.

STUDY TITLE	Organics Standard Reference Materials and Quality Control Studies	DIV OR ORG AMD
KEY WORDS	QUALITY ASSURANCE, TOXIC SUBSTANCES, STANDARD REFERENCE MATERIALS	SEC'N OR GRP QAMS
STUDY LEADER	Lee, H.B.	TEL: 637-4705
TEAM MEMBERS	A.S.Y. Chau	PAE 4200 DATE 82/10/26
ECS PROGRAM	M.R.C. - Toxic Substances	
ACTIV ELEM	Toxic Chemicals	

Goals:

1. Develop SRMs for PAHs and chlorobenzenes in sediments and monitor long term stability.
2. Design and implement interlaboratory QA study for toxic organics and conduct QA study for FICP.

Performance Indicators:

1. Continuation of SRM development
 - a) Chlorobenzenes in sediment (final phase)
 - Select a lab and contract out analysis (May to October).
 - Evaluate all in-house and contract results on EC-2 (October to November).
 - Finalize the certified chlorobenzene contents on EC-2 (October-November).
 - Write a report on EC-2 (December).
 - b) PAHs in sediment (second phase)
 - Set up capillary GLC for PAH analysis (April to August).
 - Evaluate all in-house and contract results (September-November).
 - Contract out PAH analysis (May to November).
2. QA Studies
 - Design and set up an interlab study for PAH or chlorobenzenes in sediments - report March 1983.
 - Design and run one FICP QA Study - report March 1983.

Justification:

There is an urgent demand to increase the number of organic compounds included in the IWD interregional QC program. This will involve increased effort in standardization of methodologies, preparation and certification of standard reference materials as well as implementation of QC activities.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-670

STUDY TITLE	Computer Services for Water Management Research	DIV OR ORG AMD
KEY WORDS	COMPUTER, EDP CONSULTATION	SEC'N OR GRP CSS
STUDY LEADER	Pulley, H.C.	TEL: 637-4209 PAE 1716
TEAM MEMBERS	M. Kinder, B. Malseed, U. Hamilton, J. Foley, P. Moody	DATE 82/10/26
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research	

Goals:

1. Provide centralized computing, plotting, and data entry services to all components of the Canada Centre for Inland Waters and external users approved by the Director, NWRI by:
 - a) Managing the installation effectively to provide maximum system availability to the user community.
 - b) Analyzing and, if feasible, installing all CYBER 171 software releases promptly.
 - c) Analyzing and fixing or reporting system software malfunctions as soon as possible.

Performance Indicators:

- 1a) Minimum monthly up-time for the CYBER 171 system is not less than 95%.
- b) Installation of software within three months of delivery.
- c) Analysis within two days, report within one week, fix within two weeks (if local fix possible).

Justification:

This is an ongoing support service required for most areas of activity at CCIW.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-680

STUDY TITLE	CCIW Computing Requirements Review (1984 to 1989)	DIV OR ORG AMD
KEY WORDS	COMPUTER, EDP CONSULTATION	SEC'N OR GRP CSS
STUDY LEADER	Pulley, H.C.	TEL: 637-4209
TEAM MEMBERS	J. Rogalsky, H. Comba, R. Duffield, S. Beal, B. Gervais (CASD)	PAE 1716 DATE 82/10/26
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research	

Goals:

1. Evaluate future CCIW computing requirements and prepare for the replacement of the present system in 1984 by:
 - a) Using the results of the future requirements survey and the make-or-buy analysis, select the appropriate future course of action and prepare a Treasury Board submission.
 - b) Prepare specifications for the replacement facility.
 - c) Conduct the procurement of the new facility (tender, benchmark, evaluation, contract negotiation, jointly with DSS).

Performance Indicators:

- a) Scheduled for completion - May 1983.
- b) Scheduled for completion - July 1983.
- c) Scheduled for completion - January 1984.

Justification:

Treasury Board EDP policy requires a complete re-evaluation of computing facilities to be conducted every five years.

TECHNICAL OPERATIONS DIVISION

STUDIES FOR TECHNICAL APPLICATIONS DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	83/Q6/15.
DIVISION				
601	MANAGEMENT AND ADMINISTRATION		MACDONALD, H. B.	
602	LOGISTIC SUPPORT TO NWR, FIELD EQUIPMENT AND VEHICLES		TAYLOR, W. B.	
603	OPEN LAKES SURVEILLANCE SUPPORT		HEALEY, P. M.	
604	TECHNICAL OPERATING CAPITAL EQUIPMENT ACQUISITION		TAYLOR, W. B.	
605	COMMON-USER EQUIPMENT MAINTENANCE		MAWHINNEY, M. R.	
606	SUPPORT TO EXTERNAL AGENCIES		MACDONALD, H. B.	
607	METEOROLOGICAL SYSTEMS AND DATA EDITING AND SHIPBOARD ELECTRONICS		DIAZ, J. A.	
608	LIMNOLOGICAL INSTRUMENTATION SUPPORT		DIAZ, J. A.	
609	UNDERWATER OPERATIONS		DON, F. H.	
610	REMOTE AREAS WORKING GROUP		TAYLOR, W. B.	

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-801

STUDY TITLE	Management and Administration	DIV OR ORG T/OPS
KEY WORDS	ADMINISTRATION, MANAGEMENT, FIELD SUPPORT	SEC'N OR GRP TOPDIV
STUDY LEADER	Macdonald, H.B.	TEL: 637-4217 PAC 1716
TEAM MEMBERS	S.R. Mitchell	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide planning, direction and control of technical support to scientific studies.
2. To provide efficient administration of departmental regulations and to ensure complete and accurate records.
3. To provide full secretarial support to Division Chief and his staff of approximately 27.

Performance Indicators

Provide ongoing direction for support to scientific programs.

Allocate funds and approve expenditures within authority.

Provide ongoing office management and records of correspondence. Type all cruise plans and reports in a timely fashion.

Justification

To ensure that the quality of support to scientific programs is maintained and that funds are expended efficiently and in conformity with Departmental regulations.

07/82

FORM A, PART 1

XPS 1.11.82
24.11.82

STUDY TITLE	Logistic Support to NWRI, Field Equipment and Vehicles	DIV OR ORG T/OPS
KEY WORDS	EQUIPMENT, FIELD SUPPORT	SEC'N OR GRP TOPDIV
STUDY LEADER	Taylor, W.B.	TEL: 637-4216 PAE 1716
TEAM MEMBERS	W.D. Hunt, G.M. Perigo	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide Warehousing and Field Equipment Stores in support of all NWRI studies.
2. To provide common vehicle pool in support of all scientific activities conducted from NWRI.

Performance Indicators

1. Produce detailed listing of field equipment for issue.
2. Report monthly on activities.
3. Maintain records of Field Stores issues.
1. Maintain vehicle assignment and maintenance schedule.
2. Produce monthly logs and FMIS reports to Ottawa.
3. Requisition four replacement vehicles during 82/83.
4. Maintain regional standing offers for vehicle repairs.

Justification

Technical Operations Division provides a co-ordinating role for all offsite research activities; the efficient scheduling and maintenance of field equipment and vehicles is a component part of our mandate.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-803

STUDY TITLE	Open Lakes Surveillance Support	DIV OR ORG T/OPS
KEY WORDS	SURVEILLANCE, INTERNATIONAL JOINT COMMISSION, WATER QUALITY	SEC'N OR GRP TOPDIV
STUDY LEADER	Healey, P.M.	PAE 1140
TEAM MEMBERS	Various Technical Operations Staff	DATE 82/10/31
ECS PROGRAM	Canada - U.S. and Interprovincial Waters	
ACTIV ELEM	NWRI and Regional Involvements in Canada - U.S. and Interprovincial Waters	

GoalsPerformance Indicators

To provide support and expertise to carry out the Surveillance and Biological Index Monitoring Programs by:

1. Logistic management and co-ordination of the programs.
2. Technical support.
3. Writing of cruise plans and reports.
4. Writing of preliminary descriptive reports.
5. Logistics input to the Surveillance Working Committee.
6. Technical and logistic support to Canadian Wildlife Service.
7. Technical and logistic support to Great Lakes Fisheries Research Branch, PFF.

Commencement of cruises during the requested time frames.

Completion of cruises on schedule.

Availability of vessel and technical support when requested plus the completion of the studies in the scheduled time.

Justification

To provide a continuing report on long term information of water quality and eutrophication parameters in the Great Lakes. To provide input required for the Surveillance Program under the Canada/U.S. Agreement and Water Quality Board Annual Report to the International Joint Commission.

SKA
24.11.82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-804

STUDY TITLE	Technical Operations Capital Equipment Acquisition	DIV OR ORG T/OPS
KEY WORDS	CAPITAL, EQUIPMENT, FIELD SUPPORT	SEC'N OR GRP TOPDIV
STUDY LEADER	Taylor, W.B.	TEL: 637-4216 PAE 1716
TEAM MEMBERS	J.A. Diaz, P.M. Healey	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. Inventory all capital equipment under TOD responsibility.
2. Develop and implement plan for upgrading or replacing lost, damaged or worn-out equipment.

Performance Indicators

Report on condition and utilization of equipment.

Submit purchase orders timely to research needs.

Justification

To ensure the level of support to NWRI field studies is adequate to fulfill needs.

07/82

FORM A, PART 1

AKL
24.11.82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-805

STUDY TITLE	Common-User Equipment Maintenance	DIV OR ORG T/OPS
KEY WORDS	EQUIPMENT, FIELD SUPPORT	SEC'N OR GRP TOPDIV
STUDY LEADER	Mawhinney, M.R.	TEL: 637-4691 PAE 1716
TEAM MEMBERS	J.A. Diaz, P.M. Healey, W.B. Taylor	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide logistic management and technical support for scientific projects to CCIW, Regional and Outside Agencies.
2. To continue coring support to the various agencies for continuing studies.
3. To maintain all equipment under the Technical Operations jurisdiction.
4. To investigate new equipment on the market and arrange for demonstrations for scientific users.
5. To implement the purchase of new equipment when required to fulfill the demands of our scientific leaders.

Performance Indicators

Maintain inventory.
Provide summary report.

Justification

The system and expertise presently available to provide coring support reside with Technical Operations.

5782
24.11.82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-806

STUDY TITLE	Support to External Agencies	DIV OR ORG T/OPS
KEY WORDS	FIELD SUPPORT, EQUIPMENT, INSTRUMENTATION	SEC'N OR GRP TOPDIV
STUDY LEADER	Macdonald, H.B.	TEL: 637-4217 PAE 1716
TEAM MEMBERS	J.A. Diaz, P.M. Healey, W.B. Taylor	DATE 82/09/24
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

To provide logistic support, equipment, instrumentation and field assistance as resources permit to the following agencies outside NWRI:

1. Great Lakes Fisheries Research Branch, PFF.
2. Bayfield Laboratory for Marine Science & Surveys, DFO.
3. Lands Directorate.
4. Policy Research & Social Analysis, IWD, OR.
5. Universities.
6. Ministry of Environment, Government of Ontario,
7. Inland Waters Directorate, Ontario Region (W.Q.B.).

To provide technical advice and guidance as requested.

Performance Indicators

Report on all support provided to external agencies.

Justification

The efficient utilization of support resources at Burlington reduces the need for duplication and increased Government spending on programs which are closely related. Support universities and other agencies within NWRI mandate.

07/82

FORM A, PART 1

DKSh.
24.11.82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-807

STUDY TITLE	Meteorological Systems and Data Editing and Shipboard Electronics	DIV OR ORG T/OPS
KEY WORDS	MAINTENANCE, EQUIPMENT, INSTRUMENTATION	SEC'N OR GRP TOPDIV
STUDY LEADER	Diaz, J.A.	TEL: 637-4379 PAE 1716
TEAM MEMBERS	E.G. Smith, J.A. Tyler	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide ongoing maintenance and field support in meteorological data acquisition systems and solar radiation recording systems for NWRI, Regional and Outside Agencies.
2. Maintenance and service of common-user electronic systems under TOD control.
3. Modify and upgrade present data systems for better reliability of operation when conditions warrant.
4. Meteorological data abstraction and editing for final printout in scalar and vector hourly averages of relevant parameters recorded in the field.

Performance Indicators

1. Installation of meteorological stations when requested by Study Leaders within deadlines.
2. Installation of solar radiation stations when requested by Study Leaders within deadlines.
3. Meteorological data abstraction and support on a continuing basis (i.e., 12 month period)
4. Maintaining a low down-time on all common-user electronic instrumentation with a high data return percentage.

Justification

Meteorological and solar radiation data is vital to the understanding of many physical processes. The scientific community, with their Study Leaders, requests this service of TOD in carrying out their programs. TOD provides these services to the best of its ability on a 12-month basis.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-808

STUDY TITLE	Limnological Instrumentation Support	DIV OR ORG T/OPS
KEY WORDS	MAINTENANCE, ELECTRONIC INSTRUMENTATION	SEC'N OR GRP TOPDIV
STUDY LEADER	Diaz, J.A.	TEL: 637-4379 PAE 1716
TEAM MEMBERS	J.A. Tyler, E.G. Smith	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

GoalsPerformance Indicators

1. To continue the ongoing maintenance, calibration, modifications and upgrading of self-recording current meters, digitizers, electro-bathythermograph units, shipboard transmissivity measuring systems, rosette water sampling systems and all ancillary equipment associated with the above.
1. To supply serviceable electronic current meters as and when requested for approved study programs within requested time frames.
2. Provide expertise and field support in installation and servicing of electronic instrumentation at field sites, onboard major and minor research vessels, launches, etc.
2. Maintaining electronic equipment in a serviceable condition with a high rate of data return.
3. Investigating state-of-the-art improvements that could optimize equipment performance and incorporating these improvements in existing equipment where applicable.
3. Meeting stated deadlines in equipment delivery within budget constraints.
4. Provide support and maintenance of underwater acoustic release systems for NWRI and allied agencies.
4. Maintaining stock and meeting underwater systems requests from NWRI and allied agencies.

Justification

Requests by scientific staff and Study Leaders to carry out their programs cover a vast range of old and newly developed, complex, highly sophisticated electronic equipment. This equipment could be common-user or dedicated and quality of usable data depends on a high quality of maintenance and calibration. This relieves the scientist of equipment logistics, maintenance and calibration.

07/82

FORM A, PART 1

JKL
24/11/82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-809

STUDY TITLE	Underwater Operations	DIV OR ORG
KEY WORDS	FIELD SUPPORT, MAINTENANCE, TRAINING, DIVING, UNDERWATER	SEC'N OR GRP TOPDIV
STUDY LEADER	Don, F.H.	TEL: 637-4691 PAE 1716
TEAM MEMBERS	K.J. Hill, G.D. Bruce	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To provide a training program for all CCIW qualified divers.
2. To provide diving equipment to meet operational requirements and provide for equipment maintenance.
3. To co-ordinate the diving requirements for all CCIW (NWRI, GLFRB, IWD, OR, Ship Division, DFO and outside agencies)
4. To maintain a high level of safety in all dive operations.

Performance Indicators

1. Pool/Class studies and prepare training report.
2. Maintenance and repair of diving equipment; establish records of maintenance and prepare report on equipment status.
3. As per Study Plan.
4. Supervision of diving programs in the regions (P&Y, W&N and CCIW) through testing and inspection. Attendance at Dive Policy Meetings (Environment Canada) and meetings with DCIEM and private sector.

Justification

1. To preserve a high standard of safety and maintenance for all CCIW divers.
2. To maintain a high level of expertise through trials and evaluation of new technology as it pertains to research diving.
3. To support field diving requirements at CCIW for NWRI, GLFRB, IWD, BLMSS and outside agencies for the 1983 fiscal year.

SKL
11-11-82

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-810

STUDY TITLE	Remote Areas Working Group	DIV OR ORG
KEY WORDS	COORDINATION, FIELD SUPPORT, EQUIPMENT, TECHNOLOGY TRANSFER	SEC'N OR GRP TOPDIV
STUDY LEADER	Taylor, W.B.	PAE 1716
TEAM MEMBERS	B. Kenney, C. Pharo, E. Carmack, J.A. Diaz	DATE 82/10/31
ECS PROGRAM	Water Management Research	
ACTIV ELEM	Centralized Support Services for Water Management Research (NWRI)	

Goals

1. To establish a working group having representation from various disciplines and regions.
2. To identify remote study areas where logistical, operational and safety problems will be significant; identify equipment needs.
3. Develop procedures and recommendations.
4. Initiate equipment modifications or development to meet individual and collective needs.
5. Develop expertise in remote areas research.
6. Liaise with other groups outside NWRI, conducting similar operations.

Performance Indicators

Formalize members, conduct meetings and write minutes.

Draft an operational plan, set deadlines.

Conduct field operations and evaluate new or modified equipment.

Literature search and make contact with experienced individuals in outside agencies.

Justification

To promote a greater understanding of operational needs in order to conduct research in remote areas. Promote the efficient use of existing resources, reduce duplication of efforts and maximize safety of operations in remote regions.

07/82

FORM A, PART I

JKL
24.11.82

STAFF SERVICES DIVISION

STUDIES FOR STAFF SERVICES DIVISION

SECTION	STUDY	STUDY TITLE	STUDY LEADER	83/06/15.
BUILDING AND PROPERTIES	907	CCTW PHYSICAL PLANT	VACANT	
CENTRAL REGISTRY	905	ADMINISTRATION (CENTRAL REGISTRY)	RAE, E.	
FINANCE	906	ADMINISTRATION (FINANCE)	MITCHELL, A.	
INFORMATION	908	PUBLIC INFORMATION	MACLEOD, I.	
LITERARY SERVICES	909	LIBRARY	DOWIE, E.	
MATERIAL MANAGEMENT	904	ADMINISTRATION (MATERIAL MANAGEMENT)	VACANT	
DIVISION	901	ADMINISTRATION	SMITH, J. D.	
	902	ADMINISTRATION (DSS)	FINDLAY, J. B.	
	903	ADMINISTRATION (PERSONNEL)	NAMETH, S. G.	
	910	EQUAL OPPORTUNITIES FOR WOMEN	STAFFORD, J. A.	

PROCESSING FORM FOR DIVISION SCD

NO	ORGANIZATION			ENGINEERING			TECHNICAL PREPARATIONS			DATA HANDLING			EXTERNAL			SHADOW			TOTAL RESOURCES				
	PY SAL	OM CAP	FY SAL	PY SAL	OM CAP	G4 CAP	PY SAL	OM CAP	G4 CAP	PY SAL	OM CAP	G4 CAP	PY SAL	OM CAP	G4 CAP	PY SAL	OM CAP	G4 CAP	PY SAL	OM CAP	G4 CAP		
901	7.00	177	37.6	1.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.00	177	37.6	1.4	216.0
902	--	--	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0
903	--	--	7.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2
904	5.00	134	50.0	4.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.34	154	50.0	4.5	208.5
905	3.00	75	79.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.00	75	78.6	--	153.6
906	7.00	184	160.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.00	184	160.0	--	344.0
907	13.00	3871948.0	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.00	3871948.0	6.0	2341.0	
908	1.00	25	20.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	25	20.0	--	45.0
909	5.00	137	140.0	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.00	137	140.0	2.5	279.5
910	--	--	1.6	.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2
	41.00	1119	2448.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41.30	1139	2448.0	15.0	3602.0

STUDY TITLE	Administration	DIV OR ORG
KEY WORDS	PLAN, MANAGEMENT	SEC'N OR GRP
STUDY LEADER	Smith, J.D.	TEL: 637-4656 PAC 1931
TEAM MEMBERS	Smith,S.; Boyd,F.; Leacock,C.D.; Kennedy,C.; Zrostek,H.; Gray, R.J.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Administrative Support Service	

Goals

1. To simplify and, whenever possible, automate administrative practices in NWRI and ensure that these practices are uniform throughout the Institute and responsive to NWRI personnel and higher authority.
2. Expand the duties and, with training, enhance the capabilities of A.O.s to improve the level of Administrative support provided to Division Chiefs.
3. By directing the efforts of the Administrative Team along a common path, enhance the Institute's ability to respond to HQ directives on matters which affect all Divisions (e.g. staffing, student employment, official languages, and safety).
4. By training and phased introduction of office automation, provide the Institute with automated information retrieval and enhanced word processing capabilities.
5. Produce and maintain an Institute Training Plan.
6. Conduct an indepth review of the CCIW safety program and involve all Administrative Officers in Divisional Safety Committees.
7. Monitor contract for Public Information Consultant.
8. Progress implementation of the Space Reallocation Plan consequent upon centralization of the Water Quality Labs at CCIW.
9. Review SSD operations to implement the GOC 6%/5% restraint program where possible.

Performance Indicators

1. (a)Conduct bi-weekly meetings of Administrative Team. (b) Monthly PY utilization and linear organization chart exercises to be reported through WANG system.
2. (a)Assignments to be given to A.O.s for Institute-wide responsibilities on a rotation basis, (b) complete training for one A.O. in office automation.
3. (a) Respond to HQ requests in a timely fashion.
4. (a) WANG system to be in place and operative in D.O., WHO office and Personnel.
5. (a) Training plan to be organized and in place.
6. (a) Review to be completed. (b) A.O.s to chair Divisional Safety Committees.
7. (a) Report to CCIW Executive Committee on progress of Contractor. (b) Bring administrative/financial aspects of contract to successful completion.
8. (a) Preparation of draft plan.
9. (a) Operate within GOC guidelines of 6%/5%.

Justification

To provide administrative services to the Director, NWRI, in support of the research mandates of the CCIW.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83-902

STUDY TITLE	Administration (DSS)	DIV OR ORG
KEY WORDS	PROCUREMENT, CONTRACTS	SEC'N OR GRP SSDDIV
STUDY LEADER	Findlay, J.B.	TEL: 637-4300 PAC 1930
TEAM MEMBERS	Ceolin, J.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Aministrative Support Services	

Goals

1. To provide low dollar value purchasing services for all government departments located at CCIW, ensuring that they are carried out in a cost-effective manner in accordance with the Government of Canada Supply and Services Act.

Performance Indicators

1. Optimum service in a timely fashion to all CCIW agencies on a day-to-day basis.

Justification

To ensure optimum service to the Department in all matters relating to purchasing.

STUDY TITLE	Administration (Personnel)	DIV OR ORG SSD
KEY WORDS	CLASSIFICATION, STAFFING, PERSONNEL	SEC'N OR GRP SSDDIV
STUDY LEADER	Nameth, S.G.	TEL: 637-4591 PAC 1931
TEAM MEMBERS	Pettit, S.C.; Wydryk, B.J.; Mawbey, K.; Mahaffy, D.; O'Hagan, D.; (Term), St. Laurent, S.; Desjardins, C.A.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Administrative Support Services	

Goals

1. To provide staffing, classification, staff relations, pay and benefits, training and human resource planning services for all DOE components headquartered at CCIW.

(The expenditure of NWRI O&M funds relates to telephone and stationary expenses incurred by the Personnel Unit and does not relate to the Unit's Work Plan. This section of the Annual Study Plan is therefore not completed.)

Performance Indicators

To provide optimum personnel services on a day-to-day basis.

Justification

To ensure optimum management and utilization of local departmental human resources, to ensure that all aspects of personnel legislation and regulations and associated central agency and departmental policies are adhered to.

STUDY TITLE	Administration (Materiel Management)	DIV OR ORG SSD
KEY WORDS	MATERIEL MANAGEMENT	SEC'N OR GRP MATRL
STUDY LEADER	Hicks, C.F.	PAE 1932
TEAM MEMBERS	Eadie, M.; Mellon, J.; Hicks, S; Coventry, W.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	General Support Services	

Goals

1. To provide, on a continuing basis the full scope of materiel management services, i.e., procurement, inventory control and assets management, disposal, warehousing and stores, shipping/receiving and motor vehicle maintenance and reporting. Services to be provided in a manner which will ensure optimum usage and benefits of all materiel resources available in CCIW for all units supported by this Section.
2. Introduce a centralized Materiel Management System, to include automatic replenishment, through which all materiel used in NWRI and associated units, will be issued and received.
3. Automate document procedures associated with procurement, issue and receipt of materiel.
4. Complete a total inventory of all materiels on hand, including furniture.
5. Update computerized Capital Assets Inventory to include location of major items.

Performance Indicators

1. Services to be provided on a daily basis.
2. System to be devised and put in place.
3. Automation of documentation.
4. Completion of inventory of materiel.
5. Update to be completed.

Justification

To provide materiel management services to the Director, NWRI, in support of the research mandate of ECS agencies at the CCIW.

STUDY TITLE	Administration (Central Registry)	DIV OR ORG SSD
KEY WORDS	RECORDS MANAGEMENT	SEC'N OR GRP CR
STUDY LEADER	Rae, E.	TEL: 632-4275
TEAM MEMBERS	Solvason,M.; (Part-time), Foran,D.; Ross,M.C.; (Term) Sims,J.; (Part-time - Term)(maternity leave), Jurkovic,M.; (part-time - Term)	PAE 1932
ECS PROGRAM	Management and Administration	DATE 82/10/12
ACTIV ELEM	General Support Services	

Goals

1. To provide management of records, mail services, telex and telecopy services, and maintain duplicating facilities for departments located at CCIW. Services to be provided in an efficient, cost effective manner to ensure that scientific programs are not impeded by administrative delays.
2. Review Central Registry procedures and automate, wherever possible, all routine clerical functions.
3. Review filing equipment facilities and space requirements for records, to ensure record retrieval services are provided in an efficient, and cost effective manner.
4. Maintain accurate records on cost of Central Registry services provided to other Government departments and other DOE/ECS agencies in CCIW.

Performance Indicators

1. Provide optimum and timely services on a daily basis.
2. To provide draft plan to CSSD of procedures to be automated.
3. Complete review and implement change where required.
4. Maintain records and report findings to CSSD.

Justification

To provide registry services to the Director, NWRI, in support of the research mandate of all ECS services at CCIW.

STUDY TITLE	Administration(Finance)	DIV OR ORG SSD
KEY WORDS	BUDGETS, CAPITAL, FINANCE	SEC'N OR GRP FINS
STUDY LEADER	Mitchell, A.	TEL: 637-4681 PAE 1930
TEAM MEMBERS	Hynduik,O.; Hutton,Y.; Titley,B.; Jefferson,D.; Wendel,E.; Haswell,R.; Westmoreland,S. (Term)	DATE 82/10/12
ECS PROGRAM	1.9 Management and Administration	
ACTIV ELEM	Financial Support Services	

Goals

1. Provide financial accounting and reporting services to all ECS units located at CCIW by maintaining records of allocations, expenditures and commitments, processing all accounts payable, travel, relocations and miscellaneous claims, receiving and issuing Receiver General pay cheques, maintaining a petty cash fund and making deposits to the Receiver General Transfer Account.
2. Review accounts payable and procurement procedures and automate, wherever possible, all routine clerical functions.
3. Write Finance Section of Institute Administrative Procedures.
4. Provide cross-training of Accounts Clerks.
5. Meeting H.Q. deadlines for all reports and returns.
6. Provide pay administration for all ECS units located at CCIW and in WSC-Guelph

Performance Indicators

1. Meet day-to-day requirements for IWD-Ontario, Lands-Ontario and the NWRI together with GLWQ funding from RDG-Ontario.
2. Automate to the WANG system wherever applicable.
3. Complete this requirement.
4. Train staff in the duties of positions as applicable.
5. Meet all deadlines as required.
6. Ongoing requirement.

Justification

To provide financial services to the Director, NWRI in support of the research mandates of ECS agencies at CCIW.

STUDY TITLE	CCIW Physical Plant	DIV OR ORG SSD
KEY WORDS	PLANT	SEC'N OR GRP B/PROS
STUDY LEADER	Vacant	PAE 1950
TEAM MEMBERS	Stewart,J.C.; Smith,D.J.; Platt,C.K.; Taylor,K.; McCurdy,R.J.; Adams,F.; Allaby,A.K.; Connors,M.; Clewley,D.C., Donomme,J.P.; Johnson,W.A.; Comiskey,T.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	CCIW Physical Plant.	

Goals

1. To maintain CCIW buildings and plant and progress the orderly development of the Centre, as necessary, to sustain CCIW research program.
2. Produce a CCIW development and maintenance plan which includes estimates of maintenance and construction costs and building life cycle cost analysis data.
3. Review all B&PS clerical procedures and automate wherever possible.
4. Using word processing facilities, create and maintain a record of CCIW space allocations.
5. Progress energy conservation endeavours.

Performance Indicators

1. Provide optimum service of daily requirements
2. Complete by March 1984.
3. Draft submissions for review of CSSD by September 1983.
4. Prepare listing by August 1983.
5. Progress all P&B work with a view to energy conservation.

Justification

To provide building and property services to the Director, NWRI in support of the research mandates of CCIW.

STUDY TITLE	Public Information	DIV OR ORG SSD
KEY WORDS	INFORMATION, PUBLIC	SEC'N OR GRP INFOS
STUDY LEADER	MacLeod, I.	TEL: 637-4260 PAC 1932
TEAM MEMBERS		DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	General Support Services	

Goals

1. To provide the general public, outside agencies and environment specialist groups with information which fully explains the many and varied research activities at NWRI, from a Great Lakes and national perspective, in a manner which indicates the Federal presence in the community, and the maximum research activity is obtained at minimum cost.
2. Produce NWRI Annual Report for FY 82/83
3. Expand NWRI slide library
4. Produce "Internal Waves" newsletter
5. In response to all requests for information, to apply the GOC Freedom of Information policy.

Performance Indicators

1. Provide optimum service on a daily basis.
2. Have 82/83 NWRI Annual Report printed.
Distribute same.
3. Constantly update slide library.
4. Produce "Internal Waves" bi-monthly.
5. Activate GOC Freedom of Information Policy.

Justification

To provide information support services for the Director, NWRI, on the research activities of all agencies at the CCIW.

STUDY TITLE	Library	DIV OR ORG SSD
KEY WORDS	LIBRARY, PLAN	SEC'N OR GRP LIBRAS
STUDY LEADER	Dowie, E.	TEL: 637-4530 PAC 1932
TEAM MEMBERS	Bennett, P.; (Part-time), Green, I.; (Part-time) Haley, P.; Finch, K.; Tinney, J.	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	General Support Services	

Goals

1. To ensure that the library continues to respond to the changing needs of the research community, within the constraints of limited financial and PY resources.
2. Continue initiatives to (a) eliminate cataloguing backlogs and (b) those to increase the integrity of the card catalogues.
3. To carry out administrative responsibilities as they pertain to library staff (i.e., Training, classification and staffing).
4. Subject to a full complement of staff and contingent on the continued suspension of library book orders, due to economic restraints, implement an inventory of journals to determine the losses incurred within the past 14 years. Subject to successful completion of this goal, implement an inventory of books to determine the losses incurred within the past year.
5. Update acquisition manual.
6. Revise filing system in card catalogues to conform to AACR 2.
7. Complete collection development policy and revise the acquisitions policy as required.
8. Continue initiatives to improve security in the library.
9. Subject to provision of funds, consider capital purchases of typewriter, atlas stand (s), and carousel additions to microfilm storage.

Performance Indicators

1. Provide optimum services in a timely fashion on a daily basis.
2. Progress (a) to fullest extent possible by year end. (b) To commence as time permits this long-term project.
3. (a) Input to NWRI Training Plan. (b) Update PASS. (c) Initiate staffing as required.
4. (a) Commence inventory of journals with a view to completion by September 1984.
(b) Subject to the above, completion of inventory of books by April 1985.
5. Completion by April 1984.
6. Completion by April 1984
7. Completion by April 1984
8. Completion upon directive from CSSD
9. As funds permit.

Justification

To provide library services to the Director, NWRI, in support of the research mandate of CCIW.

NATIONAL WATER RESEARCH INSTITUTE

Study Plan

NO: 83- 910

STUDY TITLE	Equal Opportunities For Women	DIV OR ORG SSD
KEY WORDS	EOW	SEC'N OR GRP SSDIV
STUDY LEADER	STAFFORD, J.A. (EPS)	TEL: 637-4369 PAE 1931
TEAM MEMBERS	M. Neilson, S. Painter, E. Rae, A. Sudar, C. Bishop, A. Lucas	DATE 82/10/12
ECS PROGRAM	Management and Administration	
ACTIV ELEM	Administrative Support Services	

Goals

That the proportion of DOE men and women within each occupational group employed by the Department at the Canada Centre for Inland Waters will be brought into line with the proportion of qualified, interested and available men and women.

Performance Indicator:

Committee Meetings.

Management Reports, Year-End-Summary.

Resource Centre Maintained.

Workshops, Seminars and Films for Presentation.

Compile Statistics - Male/Female Ratio Annually.

Equipment Purchase Resource Centre.

Book Purchases - EOW Library.

Members attend Outside Seminars and Workshops for Information.

Liaison With Other EOW Committees or Other Programs for Information and Support.

Justification:

Implementation of the Departmental Equal Opportunities for Women Program. Compliance with representation on the Regional EOW Committee and the formation of a volunteer committee for DOE at the Canada Centre for Inland Waters.

Management Contact for NWRI: Mr. J.D. Smith, Chief of Staff Services

